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THE TREATMENT OF TUBERCULOSIS

GEORGE E. BUSHNELL

Colonel, United States Army, Retired

If an animal of experiment, a guinea pig or rabbit, is inoculated with a large dose of virulent tubercle bacilli the result is inevitably death within a few weeks or months. It matters not what treatment is employed; no amount of rest or fresh air is of any avail, and liberal feeding can only slightly prolong life.

Why, then, it may be asked, is there reason to hope for benefit from such inadequate helps as fresh air, rest and food in the tuberculosis of man?

The answer is, that the animal has never been in contact with tuberculosis and as the result of such contact has had no opportunity to acquire the heightened resistance which we call immunity. The young child or the uncivilized adult who receives large, or what amounts to the same thing, frequently repeated doses of tuberculous poison without having had any previous experience with tubercle bacilli dies as certainly and speedily of tuberculosis as the animal of experiment. Animals, including man, differ as to their susceptibility to different strains of the tubercle bacillus and to the tubercle bacillus in general, but given a sufficient primary dose of tubercle bacilli virulent for the species, the result is always the same—death in a few weeks or months, provided that this dose is really the first one received. Moreover, the form of the disease is an acute generalized tuberculosis which bears little resemblance to the pulmonary tuberculosis with which we are familiar.

But animal experimentation has abundantly shown that if an animal is given a small amount of tubercle bacilli as an initial dose, and if sufficient time elapses between doses, when a second and much larger dose is given the result obtained is very different. The animal either experiences no ill effects whatever from the second dose or is very slightly affected by it in comparison with the deadly effect from the large primary dose, the results varying somewhat with the species and to some extent with the individual. There can be no question that these facts are applicable to the tuberculosis of man, that the reason why our patients

do not die as a rule of acute tuberculosis but have a chronic and limited form of the disease is because they have had small immunizing doses of tubercle bacilli and have acquired a certain immunity. A non-resistant animal which receives an intravenous injection of pneumococci does not die of pneumonia but of pneumococcus septicaemia. A certain amount of resistance is demanded in order to localize the disease as a pneumonia. Just so the non-resistant animal dies of generalized tuberculosis after a large dose of tuberculosis and only the relatively immune animal acquires tuberculosis limited to the lungs. But pulmonary tuberculosis as it usually presents itself manifests a tendency to cure or at least a tendency to become localized. So many years of conflict are required in many cases, before it succeeds in having its own way with the patient, that there can be no doubt that an immunity is present and that it is an immunity of a very high degree.

Supposing now that the patient has this high degree of immunity, that there has been only a slight lapse from the state of absolute immunity, it is reasonable to believe that comparatively slight remedial agents, a little improvement in the conditions of life, a little rest, somewhat better and more abundant food and the like, may suffice to assist the patient's organism to make the comparatively slight effort demanded to acquire again the state of absolute resistance to the tubercle bacillus. What we seek by our treatment is not to find agents that shall destroy or inhibit the tubercle bacillus, as much as to help our patients to restore their own immunity. Countless drugs have been useless, or worse than useless, in combatting tuberculosis because they have been employed with a false idea. They have been selected with a view to destroy the tubercle bacillus, or to cure some symptom such as cough, not with a view to strengthening the resistance of the patient or of restoring his immunity. It may be doubted whether any drug will ever be found that will have any material effect in impairing the activities of the tubercle bacillus, but it is quite easy to name numerous drugs which will have an injurious effect upon the patient.

In the present state of our knowledge it may be laid down as an axiom that anything that is bad for the general health of the patient is bad in the long run for his tuberculosis. On the other hand, the making of antibodies against the tubercle bacillus is a function of the nutritive activities of the cells of the body. Hence anything that favors a more perfect nutrition is of benefit in helping to regain the lost immunity. The agents that have been found to be helpful in this regard are better oxygenation

from abundance of pure air, rest to restore the weakened nerves of the patient and lower demands upon his reparative powers, and good food well assimilated. These constitute the tripod of treatment; with them wisely used wonders can sometimes be accomplished, but only, it should always be borne in mind, in cases in which there already exists an immunity which is capable of reinforcement. Some patients get well, in spite of gross neglect of treatment, others are only cured by much careful treatment; still others die with tuberculosis which advances inexorably from the very outset, no matter what treatment we may adopt, the result in the individual case depending fundamentally upon the degree of immunity which the organism is capable of attaining.

In tuberculosis we prescribe not medicine, but a mode of life. It is a simple matter to write prescriptions; it is difficult to work upon the patient's mind so effectively that he will be willing to change entirely his mode of living and to persevere in the new way for months, perhaps for years,often through his whole life. To do this requires much patience and zeal. The physician must have faith in the treatment that he prescribes, he must really believe what he says when he strives to influence the patient. You can deceive a patient for a little while but he will detect shams in daily intercourse which extends over months. The physician then must have the zeal of a missionary seeking converts. He must also have a knowledge of the reasons why certain things are necessary in treatment and be able to present these reasons so convincingly as to persuade the patient to receive them and be guided by them. And, thirdly, the physician must have skill in diagnosis to determine the exact condition of the patient so that therapeutic measures, like exercise, rest and feeding, may be so prescribed as accurately to meet the patient's varying need.

The psychical side of treatment is that which is most neglected, yet in it the most notable successes are attained. Some physicians expect their patients to be morally weak, to demand amusement, to need diversion, to be unable to exist without the presence of their families, and they excuse harmful exercise on the ground that otherwise the patient will become despondent. No good results are ever attained in that way. Others consider it necessary to keep up the patient's faith in treatment by the use of drugs, which are given as placebos, not because they are of therapeutic value. And they will tell you that as the course of the disease is long it will be necessary to frequently change the drugs employed, in order that the patient's hopes may be kept alive. This also is a device

of the faint-hearted and the pessimistic. They are trying to deceive their patients and must inevitably fail in the long run. The patients may not indeed believe that they are being deceived but they will infallibly lose faith in the efficacy of the medication.

The physician with faith and zeal will endeavor to bring the patient's will to assume command. He will encourage optimism and perseverance, a resolute putting away of doubts and fears, a stout-hearted determination to endure cheerfully a monotonous existence. The patient, to be a successful patient, must himself have a good deal of the philosopher in his makeup. The writer's experience leads him to believe that fully two-thirds of the patients can be successfully influenced psychically. Intelligence in the patient is much to be desired, but not all intelligent patients can be influenced. Next to a good immunity and a good physician the third most important desideratum in the treatment is faith in the physician and willingness to coöperate on the part of the patient.

REST

The influence of rest in abating the severity of an inflammatory process is well known. Especially important in tuberculosis is rest with a view to lessen the volume of the pulmonary lymph. The effect of motion and of friction in spreading infection from a suppurating focus is a familiar surgical fact. As Tendeloo has pointed out, it is probable that extensions of tuberculosis in the lungs are caused in a similar way. The diseased portion of the lung, having lost some of its elasticity, expands less than the neighboring healthy portions and at the same time contains a greater amount of fluid; hence the possibility of the suction of lymph, presumably contaminated with tubercle bacilli and their poisons, from the focus into the healthy lung through the numerous anastomosing lymph channels. The danger of such extensions will naturally be the greater the more acute the inflammation, and consequently the larger the volume of lymph, and the more vigorous the respiratory movements. In other words, with relative rest of the parts the neighboring healthy lung will not be as likely to aspirate lymph from the tuberculous focus, partly because from the favorable influence of rest there will be less lymph to aspirate, partly because the suction will be less. From the foregoing it is evident that breathing exercises are contraindicated in the active stage of the tuberculous process. Not only should deep breathing be avoided but motion of the upper extremities should be reduced to a minimum.

Rest is also highly desirable to promote cicatrization and encapsulation. Surgeons have discovered that the formation of fibrous tissue in wounds is greater when the parts are at rest than when they are in motion. So far as the lungs are concerned, the process may be explained as follows: Tendeloo has shown that a chemical irritant injected into the normal lung excites zones of inflammation the nature of which varies with the concentration of the irritant, there being a central necrosis, then fibrinous, then serous inflammation, last of all a zone of proliferation of fibrous tissue. Similarly in tuberculosis the formation of fibrous tissue is caused by irritation from the poisons of the disease. Now there must be an optimum amount of irritation which will excite the growth of fibrous tissue to the greatest possible extent. The parts being at rest and the irritant being supposed to be produced as a constant quantity, the influence of the irritant will be most apparent at the distance at which the optimum stimulus is excited by it; connective tissue may perhaps be formed within and beyond that zone but the efficient encapsulation will take place at the optimum distance. If the parts are in motion the irritant instead of exerting its stimulant effect over a certain limited zone will be diffused, now one and now another part of the tissues being flooded by it, but there being nowhere a zone in which the optimal stimulation is steadily applied. The result of this will be a wider diffusion of less well developed fibrous tissue, so that, while there may be in the aggregate a larger fibrous transformation, its effectiveness as a capsule will be impaired directly as the extent of its diffusion.

And lastly, rest of the body is needed for its recuperation. In fighting its mortal enemy the body has two tasks, first to make antibodies against the tubercle bacillus; second, to erect fortifications in the shape of encapsulations. Both tasks have to be performed by an organism below par. Perfect nutrition is required for the complete success of the undertakings, especially for the more difficult problem of furnishing efficient antibodies, but the nutritive activities have to be exerted by cells more or less poisoned, more or less badly nourished, fed by blood that may be fevered but which, whether fevered or not, is certainly tainted. Evidently with such tasks before it the organism cannot afford to waste its strength and substance in making unnecessary repairs, not only in replacing the cells of voluntary muscles, but much more in making up deficiencies of that mysterious force which we call nervous energy. If anything is certain in the therapeutics of tuberculosis it is that the most fatal injury that can befall the consumptive is the exhaustion of his nervous

energy by over-exertion. We must then guard his scanty store of this most precious possession by every means in our power in order that what remains of it may be used only for the most necessary expenditures.

Rest, as we use the term in the treatment of tuberculosis, means of course necessarily only relative rest. There is no doubt—in the mind of the writer at least—that the nearer the patient can approach to a state of absolute rest, if he is more than slightly affected and if the disease is active, the better his chances of cure. An example will serve to show how great an improvement may be made by apparently slight differences in regimen. A physician with advanced and extensive pulmonary lesions and with a maximum temperature oscillating about 102° and 103°, was accustomed to dress every day, go down stairs and spend the greater part of the daylight hours sitting quietly out-of-doors. When the writer assumed charge of the case he at once directed that the patient go to bed. To this the patient strenuously objected, saying that he would get weak in bed, would lose appetite, that he was not taking any exercise, etc. However, he finally went to bed with reasonably good grace. Very soon improvement in his condition became manifest, his temperature gradually dropped to normal and remained there, and the evidences of activity in his lesion abated and finally disappeared. The patient admitted, after six months in bed, that not only had he not become weak but that his muscles were larger and stronger than they were when he took to his bed. Upon passing from under treatment, the patient returned to the east. Here experts examined his lungs and told him that the disease was arrested. He became over-sanguine, exerted himself too much and finally died. The case is cited as an evidence not only of the value of nearly absolute rest as a curative agent, but also of the need of long perseverance with the treatment in advanced cases if durable results are to be obtained.

Sitting is an artificial posture which requires the constant contraction of certain groups of muscles. It is therefore not only a form of exercise, but a bad form of exercise. It is much better therefore for the patient to lie flat on bed or couch when resting. But even in lying certain minutiae must be taken into consideration. Some patients do not know how to rest, even lying down. They are constantly in motion, turning from side to side, restlessly changing their position. Or they constantly busy themselves in reading, writing or talking. For such patients even lying down is exercise, and not the best form of exercise. The full benefit of the

recumbent position can only be attained if the patient is taught to practise lying perfectly still with relaxed muscles.

It is unfortunate that the term relaxation smacks of dilettanteism in medicine, having been used in the Delsarte method, for the procedure is one of value if thoroughly understood and faithfully practised. It was pointed out long ago by Charles Darwin,[1] quoting Herbert Spencer, that the nervous energy liberated in mental activity overflows upon the muscles and, if in large amounts, upon the viscera. The mental activity of the subject can be determined in a rough way by inspection of the face, the expression of one in deep thought having a tenseness which is absent in revery or mental relaxation. Much more evident are the changes in expression when the emotions are excited. It is very easy to see that the face you watch denotes anger, grief or joy, the tension of the facial musculature varying with the emotion felt. We judge of the nature of the emotion by the action of the small and unimportant facial muscles which are but little controlled by the will, but the overflow is not limited to these groups. The infant expresses his joy by waving his arms and kicking his legs. As he grows older he learns by degrees to repress emotional display in the voluntary muscles which are well under his control, but more or less tension still exists. Furthermore, the viscera also are specifically affected by the varying emotions. Stimulation of the tear gland with its unimportant secretion of salt water discharged outside the body furnishes a safe means of minimizing the repercussion of emotion upon the viscera. The sthenic emotions raise the blood pressure and strengthen the heart action; the depressing emotions have the opposite effect. Anger is injurious to the liver; nervousness causes a polyuria; fear strengthens peristalsis with resulting diarrhoea or even vomiting. The relation of the emotions to the genital organs is also a conspicuous illustration of nervous overflow.

The converse of the above proposition, namely, that the absence of tension of the muscles has a tendency to quiet the emotions and to inhibit the general activity of the brain as an organ of thought, is not so easily proved but seems to be shown by experience to be true. There is no better means of securing sleep than to relax completely all the voluntary muscles. The method is as follows: Assume a comfortable position with the body so placed that it is in a state of stable equilibrium; that is to say, is not maintained in its position by muscular effort, the arms and

[1] Expression of Emotion in Man and Animals, 1873.

legs being likewise so disposed that muscular relaxation will not change their position. These precautions will prevent the "startings" or reflex contractions which so often disturb the body which is relaxing in its first sleep. Then give the attention to the relaxing of any muscles that are in a state of contraction, devoting especial attention to the muscles of the neck. Very often it will be found that the position thought to be one of rest has only been maintained by the contraction of groups of muscles, which when they relax cause the nose to plunge into the pillow or otherwise necessitate a change of position. The best way to relax the muscles is to expire deeply, letting the muscles go during the process, "hitting the bed hard" as the saying is, then holding the position gained in the following inspiration. There is an analogy here with the method of exploring the abdomen by pressure during expiration which is obvious. The classical position for relaxation is supine at full length with arms and legs averted, the stronger flexors thus being stretched to their full length, the weaker extensors being less likely to maintain involuntary contractions, but the principle in either position is of course the same. This procedure will seem to many a trifle unworthy of consideration, but nothing is a trifle which will exert a favorable influence to however slight a degree through weeks and months, and it is precisely the failure to take advantage of the seemingly little helps which makes the difference between success and failure in the treatment of tuberculosis. The patient having learned to relax for a few minutes—and it is useless to expect more at first—is encouraged to gradually increase the length of the time during which relaxation is obtained. being charged to seek perfect relaxation for a comparatively short time rather than to practise it carelessly for a longer period. Once he has learned the art, it is best to require him to devote to it certain periods of the day, preferably before meals, for as long a time as it can be endured without becoming burdensome.

Patients differ much as to their success. Some succeed almost too well so that they drop to sleep at every opportunity; others taking it up half-heartedly never really acquire the method. But the relaxing of the muscles is only the beginning of the schooling of the patient. He must be taught likewise to control his emotions. The influence of worry, homesickness and other depressing emotions upon the nutrition is a familiar fact. The patient must be instructed to put away resolutely such depressing thoughts, at first during periods of relaxation, later at all times. To such counsel the obvious retort is, "I know that I am sick, miss my friends, etc., and it is useless to pretend the contrary." This is

true, but the proper answer here is: "It does not matter what you know, so long as you do not allow it to excite your emotions. Your stomach does not care what you *know*, it is only disturbed when you *feel*." The idea that it is the emotional reaction to unpleasant ideas that is injurious, not their intellectual apprehension, is one more easily imparted to the intelligent patient than might be supposed at first sight. For those who do not readily yield their consent to this psychical training it is well to suggest that if they must worry and feel "blue" that they select certain hours of the day as "worrying hours" in which they may feel as despondent as they please. The suggestion rarely fails to excite a smile and it is quite evident that an emotion deliberately excited at a fixed hour will rarely be strong enough to be prejudicial. It is well also to incite the patient to suggest to himself sensations of comfort and well-being, especially during the periods of relaxation. We physicians are far too prone to neglect the influence of unfavorable suggestions upon the well-being of our patients. The fact of sickness, one's presence in a sanatorium, physical examinations, discussion of symptoms, etc., are so many suggestions of an unfavorable kind. It is our duty to train our patients to feel that their salvation lies in securing a preponderance of favorable suggestions, that here again though one really does not feel well yet if he can hoodwink his viscera into the idea that he does, he is accomplishing something worth while. Just as the intellectual apprehension of the fact of illness does no harm when divorced from the emotional reaction to the same unpleasant fact, so a more or less feigned sense of well-being does good though the intellect perceives its falsity; moreover, the feigning of a sense of well-being is the best way to realize a genuine sensation of the same kind.

The tuberculous patient is neurasthenic; that is, he has a weakened nervous system. Wundt long ago showed that if the sciatic nerve of the frog's leg is stimulated by an electric current, the effect of the stimulation of the fresh nerve is to produce, first, an inhibition of contraction, with continued action, later, a contraction of the muscle. But when the nerve has become exhausted by repeated stimulation, the inhibition is absent and the first effect of the current is contraction.

In other words, excessive irritability of the nerve is a sign of nervous exhaustion.

Similarly the nervous system shows its weakness by a too ready yielding to emotion, a too rapid response to stimulation, a tendency to expend energy to the impoverishment of its store. Hence it is said that the

neurasthenic have anaesthesia of fatigue. A stimulus which would remain unnoticed by the healthy sets the nervous "on edge." A healthy man has no tendency to expend energy except for adequate reasons, the exhausted nervous system expends energy with extravagance on slight or no provocation. The restlessness of the sick is felt as well by the over-fatigued. They are "too tired to rest." So the neurasthenic keeps up his activities to the point of exhaustion, and often prides himself upon an activity of mind and body which is overdrawing his capital. A patient will often claim with pride that he has a too active mind because unable to quiet his brain, though its activity is employed to no useful purpose. He may also be too "active" in his own estimation to need bodily rest. When a patient, after working beyond his strength, or at the end of long journeyings, is at last put to bed, the nervous excitement which has kept him up abates and he begins to realize his true condition of weakness. He sometimes misinterprets this and believes that rest in bed, instead of revealing his weakness, is causing it. Not uncommonly he will demand to be allowed to leave his bed, declaring that he is growing weaker every day and will soon die unless he gets up. No time should be lost in explaining to the patient the need of rest and the reason why he has not apprehended that need. Complete rest with the relaxation of the muscles is an imperative indication; the patient must learn at the earliest moment what his weakness really is, and, as it were, build up strength from a solid foundation. Having recreated in some measure his energy, the next problem is to persuade him to store it up. The over-irritability of the nervous system does not disappear in a day. The patient is impelled to expend his minimal quantity of energy as soon as it is created. Whereas he much needs a bank-account, he acts like the child who must spend his penny as soon as he receives it. The patient most difficult to control is he who has not experienced an exhaustion, the existence of which could not be denied. The thoroughly exhausted patient does not forget his experiences and is taught by them to appreciate considerations like the foregoing. But the patient who is simply "nervous" and restless requires much patient endeavor to bring him to a realization of his need of absolute rest. In fact, the best thing that could befall him would be an accident like a fracture, which demands long rest without any question. The history of a patient of the writer will best illustrate the fact that conditions which call for unusually prolonged rest often operate to the ultimate great advantage of the patient. A naval officer, 58 years of age, had a rather large and active tuberculous lesion, involving the right

upper lobe. There was sometimes rather high fever, but this abated under rest and he became able to take some exercise without apparent ill effect, except that cough and positive sputum persisted. The patient and his family were under the impression that an active life was to be desired and by rides and walks he fancied that his condition was improved. The probable outcome of the case appeared to be a considerable prolongation of life without absolute arrest of the tuberculosis. But fortunately for him, a complication usually regarded as serious, declared itself. His activities began to be impeded by pains which he ascribed to rheumatism and treated ineffectually in various ways. Finally the severity of the pain drove him to consult the writer who at that time had not been in direct charge of the case. It then appeared at once that he had the classical signs of Pott's disease with a well marked "knuckle" over a dorsal vertebra. The prominence of the protrusion, the severity of the pain and, above all, the fact that when attempt was made to apply a cast the pain shifted from one to the other side of the body, led to the diagnosis of such a breaking down of the vertebra that the spinal cord was in danger of compression. The attempt to use a cast was therefore abandoned and the patient was put to bed on his back. There he remained, without once turning on his side, for seven months. At the end of this long period, when he finally arose, his spine was soundly healed and the disease of his lungs was completely arrested. This happened 12 years ago. The patient is still on duty, and in excellent health. There can be no doubt that the spinal complication was the most fortunate event that could have befallen him as far as the cure of the pulmonary condition was concerned.

The treatment of tuberculosis as thus outlined is not an easy treatment. It is well therefore to train the patient from the outset to feel that he has a responsibility for the outcome, that he must learn to exercise control over his nervous system, that the treatment involves a discipline which is not easy to acquire. The following case illustrates what may sometimes be accomplished with an intelligent and docile patient. An officer of the army arrived at Fort Bayard upon a litter, after a long journey, in such a state of exhaustion that death appeared imminent; in fact his mother was at once sent for to be with him at the last, and stimulation was resorted to in the hope of keeping him alive until she could arrive. The case was one of acute involvement of the entire right lung. There was an enormous cavity, and the fever was high. In short, the case was one that seemed inevitably destined to death. The patient requesting

a prognosis, he was told that he was very ill and that no promise of recovery could be given but that there were certain things that he could do to help himself, and that they were worth trying. The psychical treatment was thereupon explained to him. He grasped the idea quickly and devoted himself to its realization with his whole soul. The result was that his mother, who came to see him die, remained at his bedside for two years. When he was finally able to leave his bed no one who saw the rosy face and well rounded limbs of the patient would have dreamed that he had lost practically the whole of his right lung. He is still living after 12 years, is married, and at last accounts was in good health. If the skeptic doubts the connection between the brilliant outcome and the method of treatment, the writer can only rejoin that he has never seen so ill a patient recover, nor has he ever known a patient to carry out so thoroughly and persistently the principles of treatment inculcated.

The thought of spending endless days in bed, without occupation, is terrifying at first. But it is surprising how quickly the docile patient learns to adapt himself to the situation if the issue is squarely presented to him at the outset. The psychical training gives him occupation and in favorable cases the manifest benefit therefrom encourages perseverance. It helps greatly to have a schedule of work for the day, so many minutes or hours for muscular relaxation, succeeded by reading or listening to reading, perhaps writing letters, the care of the toilet, etc., then another period of relaxation, and so on, but always with the idea that the rest is the serious work of the day, its interruption the less frequent and prolonged periods of amusement. And so the patient soon learns to spend his days in a kind of busy idleness which makes them seem not so long. Much depends upon the persistence and robustness of view of the physician. If the latter indulges in an injudicious sympathy, tries to amuse the patient, teaches him to depend on outside helps instead of upon himself, not much will be accomplished. In short, the patient must be made to feel that the physician really believes in what he teaches. The patient must be taught the necessity of not interrupting the treatment on any excuse. The tubercle bacillus has no "days off," he must therefore take none himself. Rest must be by all means associated with the outdoor life so far as is practicable.

FRESH AIR

Fresh air is perhaps as important a factor for the cure as rest, in the long run, but the difference between the air of a well-aired room and the

outer air is not great enough to justify loss of rest or the endurance of discomfort in order to obtain the latter. A very ill patient is not strong enough to endure the vicissitudes of the outdoor life and does better in his room with windows raised. A stronger patient will profit by sleeping out of doors the whole, or the greater part, of the year; but no patient should be permitted to defy the storms and thus run the risk of becoming wet and chilled. A certain amount of hardening is advisable. Covering should be rather light than heavy. Warmth which leads to perspiration is always bad. For the same reason, hot-water bottles should be used sparingly and for brief periods, and so called chest-protectors should be eschewed altogether. As in the case of rest, it is important that the patient should feel that the physician is in earnest in his advocacy of fresh air. This he will not believe if he finds that he is permitted to stay in ill-ventilated rooms or even sit behind the stove in a room filled with tobacco smoke. Strictness of discipline in this regard is of much importance.

EXERCISE

The febrile tuberculous patient in whom the maximum daily temperature habitually exceeds 99.5°F. should unquestionably be kept in bed. As the temperature falls the patient may be allowed to attend to his own toilet, perhaps shave himself or walk about a few minutes. Such relaxation of the regimen should occur immediately after eating, in order to take advantage of movement as a stimulation to peristalsis. It is better to permit alternations at first only between lying in bed and walking or standing than to allow much time to be spent in the sitting posture even without walking. These indulgences should be carefully specified, their duration prescribed and increase in length made very gradually under control of the temperature by repeated thermometric observations. The question as to the importance and significance of minor fluctuations in temperature is a most difficult one to decide. The temperature of a normal man who is left in bed continuously for weeks, shows fluctuations of a fraction of a degree from very slight causes, as interesting studies have demonstrated. In these studies the temperature of normal men at work was also taken, night and morning, during a month, with the result that temperatures above 99°–99.2°, 99.3°, even 99.5°—were not uncommon in the evenings. The temperature which, taken before breakfast after a night's rest, was perhaps 97.8°, after half an hour's work habitually rose about one degree. The members of the group studied in this way four years ago have all remained well. The fluctuations of temperature while

perhaps not, strictly speaking, an entirely normal phenomenon were at least not evidence of a masked tuberculosis. It is therefore unsafe to regard minor fluctuations of this kind an evidence of tuberculosis in doubtful cases without careful regulation of the mode of life. The well man may show considerable fluctuations but they are developed in the course of an active life with its irregularities as to expenditure of energy and as to amounts and character of food consumed. If on the other hand the tuberculous patient is shielded from vicissitudes and leads a regular life, similar changes of temperature may rightly be ascribed as a rule to the tuberculous process *per se*. The problem however remains one that will frequently tax the acumen of the physician. The best rule is to require the acute case to rest irrespective of temperature, as the conditions become more chronic to be guided strictly by the thermometer, and when the case has become one that is progressing toward arrest to ignore the slighter fluctuations of the temperature. Cases with large lesions must be treated with more severity as respects the enforcement of quietude than those with small lesions. All of which goes to show the absolute necessity of an accurate diagnosis of the patient's condition in every respect if one is to gauge with correctness the indications for rest or exercise, and, if the latter is permitted, its amount. Each case must be the subject of special study. No hard and fast rules as to fluctuations nor as to thermometer readings which permit exercise can be laid down. In case of doubt it is always safer to err on the side of too much rest. Exercise as a therapeutic measure should be restricted to the chronic case and the physician should be quite sure that he is able to determine the fact of chronicity before making such prescriptions. The writer has sometimes has occasion to reproach himself for undue leniency in permitting exercise prematurely. The error most frequently made is to allow the amount of exercise to be too rapidly increased and to fail to insist upon adequate control of the effects of exercise by the thermometer. As has been well said, the patient who begins to exercise has reached a period of danger in his course of treatment. He can hardly be too carefully watched. In the southwest are the graves of many consumptives who have been told to "rough it and keep away from doctors."

FEEDING

The patient who has worked beyond his strength has often been too tired to eat for long periods, in some cases has had little and poor food.

Put such a patient to bed, with a mind free from care, and give him an abundance of good plain food, and it is surprising how much he can eat and how well he will digest his food, gaining weight rapidly and improving unmistakably in general condition. In a case of this kind, where there is a deficit to make up, the problem of nutrition is easy—all that is necessary is to give the patient what, and as much as, he wants. When cases from the proletariat of large cities are admitted into tuberculosis institutions for comparatively brief periods, a few months at most, the great majority of the patients will belong to the class which is able to eat well and will be benefited by so doing. Hence has arisen the teaching that a patient should be overfed, that hyperalimentation is one of the factors of treatment. So it is, so long as there is a deficit of nourishment to be made up. He who has starved long can feast for a while with impunity.

But if such a patient remains long under treatment, the time will come when he is "filled up," as the saying is. He has made up his deficit, and from that moment he becomes like others with regards to the dangers of surfeit. Many patients have always had an opportunity to rest and an abundance of good food to tempt their appetites. They have no true deficit to make up. For such patients stuffing with food is only prejudicial. In many cases difficulties of digestion are dependent upon the kind rather than the amount of food. Too much of concentrated foodstuffs, acids, sugars, fats and meats, tax a system not stimulated by exercise and produce heaviness, gastric acidity and bad temper. The stomach and intestines of him who lies still all day, if kept over full, become enfeebled in their peristalsis, and dilatations readily occur. The food consumed at one meal should be entirely digested before the next meal. It is a common fault to overfeed from a sense of duty, with no real desire for food. The patient who begins the day with a too ample breakfast often makes that breakfast his only meal. It is often wise to omit a meal or two until a healthy hunger develops. He who is a little ahead of his needs is never hungry, he who does not quite satisfy his appetite always enjoys eating. There is a truth in the saying, "It is better to eat yesterday's dinner than tomorrow's." In view of the prevalent doctrine of the need of overfeeding in tuberculosis, it may be well to cite a case in which the cure of tuberculosis progressed, though the patient was on what might be called starvation diet. An officer returned from the Philippines with small tuberculous lesions of both upper lobes. The sputum was positive for tubercle

bacilli. In addition to the tuberculosis he had tropical sprue, and had had hookworm. Upon arrival he was unable to eat anything for many weeks except small quantities of milk. To this he was finally able to add a small quantity of grapenuts and very gradually to increase his food supply by an occasional egg, a few biscuits, a ripe pear, etc. Notwithstanding the fact that his diet for months was greatly deficient, both in calories and in nitrogen, his tuberculosis progressed most favorably to complete arrest. He finally recovered entirely from the sprue, and has been on duty in the Philippines for six years.

The fact that semi-starvation does not necessarily lead to tuberculosis, as is commomly believed, has been demonstrated on a large scale in the case of the French prisoners. The alarming accounts as to the prevalence of tuberculosis among these unfortunates, which have received universal credence, are now found to have been greatly exaggerated. In certain groups of returning prisoners the percentage of tuberculosis has been rather high, but among large numbers returned of late it is reported to have been surprisingly low.

SYMPTOMATIC TREATMENT

The symptomatic treatment of the consumptive does not differ from that of other patients. Cough medicines should be used sparingly and only for special indications, as, for example, after hemoptysis. Much can be done by teaching the patient to suppress useless cough. The patient who has a cavity should be taught to empty it, at least once a day, by assuming a position that will favor drainage into the bronchi. Some patients have the idea that it is necessary to expel expectoration at the earliest possible moment and often exhaust themselves by prolonged coughing in order to raise an insignificant pellet of mucus, which, with a little patience, would have been forwarded by the natural mechanisms so as to be readily ejected with little effort. The idea that expectoration is infectious for the patient and must be gotten rid of without delay is one for which the physician is sometimes responsible. A worse error is to inculcate the notion that it is extremely dangerous to swallow sputum. Patients are sometimes kept in a state of nervous apprehension, which is most prejudicial to their recovery, by such injudicious teachings.

The tuberculous patient ascribes all his unpleasant sensations to the tuberculous process. For him, the pain in the chest which is so common, always means pleurisy, and a little diarrhoea raises the spectre of intes-

tinal tuberculosis. The physician can be of much comfort by teaching that the fugitive pains in various parts of the body, and the various manifestations of indigestion, are common in all those whose health is below par and have no direct connection with tuberculosis. At the same time, such symptoms call for inquiry as to the cause with a view to improving the personal hygiene and the patient should be encouraged in the ambition so to regulate his life as to have as nearly perfect digestion and elimination as can be attained under the conditions.

TUBERCULIN

The writer has too often seen very serious harm from tuberculin, as employed by others, to be enthusiastic concerning its use. Tuberculin is most helpful to those who need help least. Advanced cases of tuberculosis are very seriously injured by it. But the rather numerous class of sanatorium patients who have little or no active tuberculosis, their disease being of a chronic, though often diagnosticated as acute, type are able to tolerate it, sometimes apparently to their advantage. Those physicians whose practice is mostly confined to cases of well marked manifest pulmonary tuberculosis are rarely enthusiastic advocates of its use. An accurate diagnosis is indispensable. Tuberculin in the hands of the ignorant is a terribly deadly weapon. The writer believes that cases of genuinely active tuberculosis are more often harmed than benefited by it and is of the opinion that better results in the long run for the average patient are attained by the psychical treatment. He is therefore opposed to its use in army hospitals.

METHUSELAH AND LIFE IN THE OPEN[1]

VINCENT Y. BOWDITCH

Boston

"It is recorded of Methusalem, who, being the longest liver, may be supposed to have best preserved his health, that he slept always in the open air; for, when he had lived 500 years, an angel said to him, 'Arise, Methusalem, and build thee an house, for thou shalt live yet 500 years longer.' But Methusalem answered and said, 'If I am to live but 500 years longer, it is not worth while to build me an house. . . . . I will sleep in the air as I have been used to do.' Physicians, after having for ages contended that the sick should not be indulged with fresh air, have at length discovered, that it may do them good. It is therefore to be hoped, they may, in time, discover likewise, that it is not hurtful to those who are in health; and that we may then be cured of the *aerophobia* that at present distresses weak minds, and makes them chuse to be stifled and poisoned, rather than leave open the window of a bedchamber, or put down the glass of a coach."

Thus wrote our wise and famous old philosopher Benjamin Franklin in an article entitled, "The Art of Procuring Pleasant Dreams," for the *Columbian Magazine*, Philadelphia, in September 1786, at the request of a maiden lady of that city. "There is nothing new under the sun," we are tempted to exclaim when we read words like these uttered over a century ago by a wise man. Indeed, it is with a sense of discouragement that we learn that even the "father of medicine," Hippocrates, taught the value of fresh air, while preaching and practising almost everything else which we had fondly believed was the result of modern thought and investigation. One is inclined to feel at first that, after all, the world has not progressed as we had imagined, and that all effort at originality seems pratically but a repetition of what has been spoken and done well, long before, by others.

Soberer thought, however, brings us consolation, and in spite of discouragement, a more cheerful thought comes to us as we review the

[1] Read before the Clinical Section of the Fourteenth Annual Meeting of the National Tuberculosis Association, Boston, June 7, 1918.

results of determined effort to develop an idea or a suggestion which may have been lying latent for years, only needing some stimulus, like the touch of water in the desert, to bring forth abundant fruit.

In spite of the fact that the value of "life in the open" has received such indubitable proof as evidenced in the life of that veteran of many summers whose name is a synonym of longevity, and notwithstanding the efforts of a few wise men since his day to convince the multitude that they were not insane in their advocacy of fresh air combined with close supervision of the patient, it has been only within the last quarter of a century that there has arisen a steadily-growing conviction that in this method, long neglected, we have one of the greatest factors known for the cure and prevention of tuberculosis, even in regions where previously it had been thought impossible of accomplishment. To one like myself, who can recall the methods formerly used in the treatment of tuberculosis, and the discouraging and unsatisfactory results of earlier times, the present attitude of mind of the public and the results which have been obtained combine to give a sense of pleasure and exhilaration, not perhaps fully appreciated by those of a younger generation, who, conscious as we all are that we have not found a panacea, yet fail to fully recognize what marked changes for the better have really been made in the special treatment of tuberculosis during the last twenty-five years.

Think of the quantities of cod-liver oil and whiskey prescribed in former days; the tightly shut rooms with closed windows; avoidance of "night air" and fear of draught; the sweating patients swaddled in warm clothing lest they should "take cold!" Contrast these dreadful methods with those of the present day.

Granted that the early extravagant and unwarranted statements by zealots, eager to prove the efficacy of modern methods, brought for a time the inevitable reaction of feeling and distrust of the theory of open-air treatment because of its failure to cure every case of tuberculosis; yet we have only to note the steady growth of sanatoria, hospitals, dispensaries, open-air schools, the so called home treatment throughout the civilized world, to prove that the theory suggested aeons ago has at last taken root and grown to astounding proportions, based upon results which warrant the belief that tuberculosis can be conquered and finally placed in the category of preventable diseases.

Why, then, should it be necessary to harp upon this theme still, when to most of us there is no doubt that fresh-air treatment pushed to the limit is the largest factor in whatever gain we have made thus far towards the

control of this disease? Because, in spite of undoubted and innumerable proofs, we occasionally find a note of skepticism, which comes often from lack of sufficient experience, and again from ignorance of facts among people who make sweeping assertions which, left unchallenged, are capable of misleading many who do not think for themselves.

A little more than a year ago, I was surprised and startled by reading in a well-known New York periodical the heading of an article entitled, "The Superstition of Fresh Air." The writer says, "The popular idea that there is something peculiarly beneficial or invigorating about out-door air has been effectually dispelled by the experiments carried on during the last few years under the auspices of the New York State Commission on Ventilation!" He proceeds to quote statements from another periodical to the effect that children in rooms provided with a liberal supply of out-door air do no better work than those in a room where the air is partly "recirculated." He then speaks of an "elaborate system of experiments to test the comparative speed of learning, memory," etc., and finds the results about the same,—"if anything, in favor of the latter method." In short, he recommends, in place of the simple system of letting in fresh air by properly opened and guarded windows, the substitution of expensive methods of ventilation by means of fans which are supposed to force into rooms with closed windows, air, which, by an elaborate system, is "washed, cooled, or warmed so as to give the proper degree of moisture necessary for health." After extolling these methods, the writer says, "Of course, without such purification and rectification, the air of the room would soon become intolerable, so that those of us who live in houses not provided with a circulatory system of this type had best keep our windows open." In short, after beginning his article with the astounding and misleading title, "The Superstition of Fresh Air," he proceeds to laud the introduction of expensive methods of ventilation, which in many cases have quite failed in their object, and finally grants the efficacy of fresh air by urging us to keep our windows open, in direct contradiction to what the title of his article implies.

It would seem almost futile and useless to spend time in discussing such contradictory statements were it not that, as they appear in the editorial columns of a reputable periodical, they carry weight in the minds of many who are prone to regard all innovations upon old and established methods as "fads" which will sooner or later disappear; and for this reason, I feel impelled to enter a protest against such assertions as utterly contrary to the experience of all those who have studied the problem of how we can

best preserve health and cure disease in the simplest and at the same time the most efficacious way.

It would hardly seem necessary to offer to an assemblage of people like this proofs of the value of fresh air in refutation of the title of the editorial, and yet one or two instances from my own experience may serve to emphasize my protest against the statements I have quoted. During the early years of the Sharon Sanatorium, which is now in its twenty-eighth year, we were content with compelling patients to be out of doors a cer-

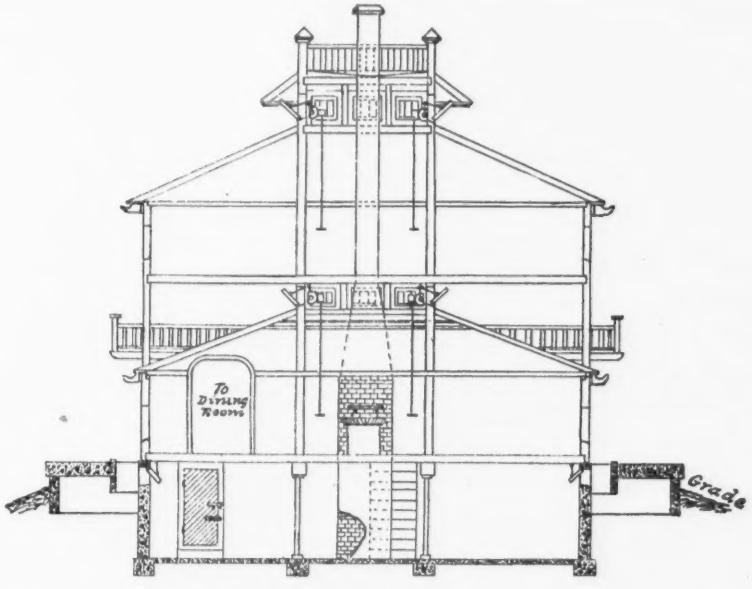

FIG. 1. CROSS SECTION OF TWO-STORY "MONITOR-TOP" DORMITORY DESIGNED BY DR. F. E. FISH, SUPERINTENDENT OF THE MASSACHUSETTS HOSPITAL SCHOOL FOR CRIPPLED CHILDREN, AT CANTON, MASSACHUSETTS

tain number of hours a day, and then to enter the house, in which the windows were not kept constantly open. Often, as is inevitable with collections of people, the atmosphere was not so fresh as it should have been, especially in the evening, with the lamps then in use lighted in the living-rooms where patients gathered about the tables. These conditions distressed me frequently on my evening visits, although even then the results of treatment were beginning to be very gratifying as showing what could be done with pulmonary disease under conditions of climate, altitude, etc., which were thought at that time to be most unfavorable for

effecting any radical change for the better in tuberculous patients. For the first six or seven years, the conditions were as I have described. I then determined to take more radical steps; to keep the windows wide open night and day, even in winter; to make the patients dress more warmly and practically never to be in any close, confined atmosphere; and later, to establish sleeping balconies. I confess that at first I trembled at this step, fearing the possible effect of extreme cold upon some of the patients, who might possibly be more prone to attacks of bronchitis under such rigorous conditions. To my surprise and pleasure, however, I found that my fears of this contingency were unfounded, except perhaps in very rare cases; but to my great delight, the most striking thing was the marked

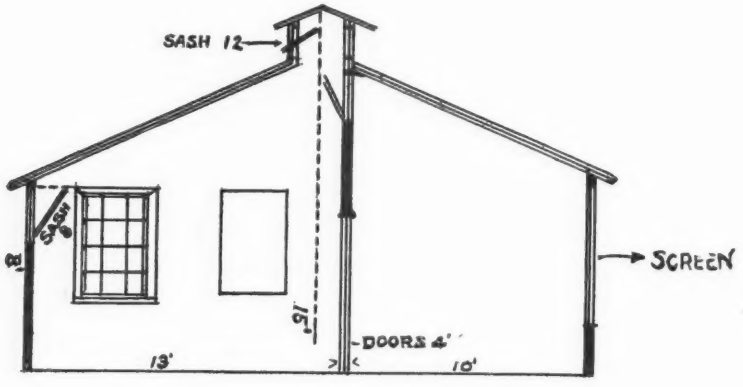

FIG. 2. CROSS SECTION OF THE DORMITORIES IN THE CHILDREN'S PAVILION AT THE SHARON SANATORIUM

increase in the number of arrested cases in the years following my change of plan. The early cases seemed to "forge ahead" in their improvement, and even fairly advanced cases, as a rule, improved more rapidly, and I found that the number who did not improve, or were in any exceptional cases injured by such treatment, was so small that I finally decided to persist in the newer method. And I have never changed it, even in the coldest weather; for we have found that at the expense perhaps of a certain amount of personal comfort, the advantage to be gained in bodily health far outweighs any possible objection.

This brings me to the question of the relative merits of schools in which fresh air is used to the limit, and those where the ordinary old methods,

or even the elaborate and expensive ventilating systems, are used. The misleading title of the editorial referred to before is flatly contradictory to the experience of those with whom I am brought in contact. Mr. Robert Rivers, a teacher of many years' experience, who now has a flourishing out-of-doors school in Brookline, Massachusetts, for well children, after a long experience with the older methods, tells us that there is no possible doubt in his mind of the good effect of study in the fresh air upon the alertness of mind and the vigor of body of the children. As one of the proofs of this, he cites the fact of the protest at first of some of his teachers at the supposedly insufficient time allotted for certain studies in his recently opened school. They soon discovered that he was perfectly correct in his statement, that the children showed much greater facility in studying than under the old methods, and that the hours allotted were none too short for their purpose. The lessened susceptibility to "colds in the head," and even to the infectious diseases among his scholars has also been proved. He is most emphatic in his statement that any failure to find the same results (as has been noted in a very few instances which have had more or less publicity given them), is due to some faulty management and lack of proper construction and supervision, such as is of course needed in all such establishments.

Mr. Rivers believes that children, when properly clothed and properly watched as to their power of resisting cold, can be placed with perfect impunity in buildings which are exposed to the outer air except on the north side, no special form of heating being used except electric pads placed in close proximity to the children's desks, to be used as occasion may require. A modified use of radiators, he would allow, however, to obviate dampness.

Mr. Geoghegan of New Bedford, is an enthusiastic believer in open-air schools, as evidenced at the Sassaquin Sanatorium, and he is making strong efforts to have similar rooms established in the public schools of that city. Dr. Chadwick of our Westfield State Sanatorium, is also an advocate of fresh-air schools, but he does not believe that the best results follow exposure of the children to the severest cold even when warmly clad. However authorities on this subject may differ in small details of this nature, they are unanimous in their advocacy of open-air schools, and it is gratifying to note the steady increase in the numbers of such schools throughout the country. In Boston, some of the buildings already have been fitted up with rooms for delicate children, where they

may be exposed to the open air more than is possible in the usual form of school rooms.

I may be pardoned for again mentioning a concrete instance in my own experience of the value of open-air treatment in schools. A former loyal graduate of the Sharon Sanatorium, who recovered her health after a brave fight of three years, resumed her teaching in a school in one of our largest cities. She wrote me last year, "I have scarcely lost a day of teaching since I left Sharon, sixteen years ago. I moreover teach all my children the value of fresh air as taught me at Sharon. During the past winter, I have had my school windows open most of the time, and have not had one child away with a cold during the whole season, as against epidemics of 'colds' in the other schools here." Such testimony is vastly more convincing than columns of figures to prove a theory.

In advocating such methods, it would hardly seem necessary to say that they should always be carried out with due regard to the individual child. As in every other form of work, judicious care is a necessity. Some children naturally are more sensitive than others to cold and care must be taken to see that there is no undue chilling of the body with consequent detriment to the child's health. The effect upon the nervous system should be watched, to see that no abnormal energy is developed, such as may bring depression after over-stimulation. In short, common sense and patience are essentials to success in this form of treatment as in every other effort to help humanity.

In regard to methods of ventilation, it may not be generally known that there still exists a law in Massachusetts which endeavors to compel people in certain buildings of a public character, like factories, schools, hospitals, etc., to use a complicated form of ventilation by which air is forced into rooms by fans, or drawn out from them by means of an "aspirating" heated coil in one or more flues leading from the apartment, the law stating that, in order to insure the proper working of this method, the windows of the room must be kept closed. This law is more or less under the supervision of the district police, but I challenge any one to find the teacher in our public schools who would not find fault with such methods, and who has not at times broken the law by opening windows because of the intolerable condition of the atmosphere in the building.

As an instance of wonderfully good ventilation by the simplest methods, unencumbered by expensive and often very faulty apparatus (to say nothing of engineers who, perhaps with a laudable desire to save coal, deliberately take measures to obstruct the proper working of the more

complicated mechanisms), it is most interesting to note what has been gradually developed at the Massachusetts Hospital School for Crippled Children at Canton, Massachusetts, under the careful guidance of Dr. F. E. Fish, the superintendent. The dormitories there are simple in construction, with numerous windows on the sides, under which run steam pipes; the roof of the building is of a broad A shape, with a "monitor top" in which ventilating windows are placed. The windows on the sides of the dormitories are open at the top, the warmed air rising to them. By numerous experiments, it has been proved that there is a constant stream of air upwards, escaping through the monitor top. The older form of dormitory had a flat roof with ventilators to allow escape of air, and complicated systems of forcing in the air by fans, and withdrawing it by heated coils in the large ventilating shafts. Comparisons were made between the two systems, and it was found that after filling the older room with smoke, it cleared very slowly and lingered in the corners; but in the newer rooms the smoke ascended rapidly and went out through the monitor top, the atmosphere becoming clear in a very few moments. The practical results of this simple and much more effectual method are interestingly told in the report of the hospital for the year ending November 30, 1915. The number of throat and bronchial affections was markedly less than where the older forms of ventilation were used; in fact, they became comparatively rare. So successful were these dormitories that after some difficulty with the state law, a new school house in Canton was built on exactly the same lines, with infinitely improved conditions in atmosphere (in the school rooms), and at much less expense than with the older methods. Somewhat similar buildings exist at the now well-known Sassaquin Sanatorium at New Bedford through the efforts of the Rev. William B. Geoghegan. In the new children's pavilion at Sharon, the same principle has been adopted, with modifications and improvements which meet the entire approval of Dr. Fish. It is my belief that, owing to the indefatigable zeal and devotion of our superintendent, Dr. Griffin, we have a building at Sharon which may well serve as a model for those who are thinking of building similar structures. To those of my hearers who are especially interested in these matters, I can only urge their visiting these easily-reached institutions during their visit to Boston.

Since writing the above, my attention has been called to the extremely interesting and invaluable paper by Dr. S. Josephine Baker, Director of the Bureau of Hygiene, Department of Health, New York City, published

in the *American Journal of Public Health* for January, 1918. This paper gives the results of a series of scientific observations on the comparative prevalence of respiratory diseases during the winter months among school children in New York in buildings ventilated by the complicated and expensive mechanisms, and the simpler methods of open windows with sufficient heating apparatus. It would be impossible in this paper to go into the details of this interesting series of investigations, but it is a triumphant exposition of the superiority of the direct fresh air method which I have touched upon in the foregoing remarks, for Dr. Baker conclusively shows that respiratory troubles were very much more prevalent in the schools where artificial ventilation is used than in others where direct contact with fresh air by means of open windows with direct heat radiation is resorted to. This article should be carefully studied by every one interested in this important subject.

Such are a few of the facts, ladies and gentlemen, which it has seemed to me worth while to bring before you to-day in refutation of any such theory as that suggested in the editorial referred to in the beginning of my paper. There is no "superstition of fresh air." This form of treatment, both as a curative and preventive measure, good for the sick and the well, has come to remain. It may not be productive of such a prolonged stay upon this earth as that vouchsafed to Methuselah, and there may be those with a cynical outlook upon life who would reject any such condition as undesirable, but it will at least tend to prolong the normal span of life for those who love it, and to make that life better and happier for all.

TUBERCULOSIS: ITS TREATMENT AND MISTREATMENT

J. V. WRIGHT

From the Woodlawn Hospital, Dallas, Texas

Of recent years the bulk of the literature coming from physicians who make a specialty of treating tuberculosis has stressed early diagnosis. This is as it should be; in this we are wise. However, when we make an early diagnosis and fail to give the patient proper, intelligent and very definite advice we are distinctly otherwise. It is this phase of the treatment of tuberculosis that I wish to take up in this paper.

When tuberculosis is discovered in its incipiency, in almost every instance the patient has a chance for an arrestment of the trouble in from six to twenty-four months if properly taken care of. And by being taken care of properly, I mean placed at once in a well regulated institution, an institution that not only gives the patient the best chance to get well while there, but goes further and educates him with regard to the things which are necessary for him to do in order to stay well. The importance of doing this as soon as the diagnosis is made is plainly seen when we recall that it only requires a very short while for an incipient case to become a moderately advanced, and a moderately advanced to progress to an advanced case. Moreover, when we face the facts regarding the possibilities of arrestment and final cure of the disease in these respective stages as claimed by the best authorities and proved by results, we find that it is possible to effect a cure in over 90 per cent of incipient cases, an arrestment and possible cure in over 60 per cent of moderately advanced cases, and quiescence in about 30 per cent of advanced cases. Very few ever get well in the advanced stage.

From these reports we can plainly see the advantage of an early diagnosis. Likewise, from these same reports, we can see the importance attached to the advice we give our patients after the diagnosis is made. Oftentimes when we wait two months to give this advice the patient has lost his chance of recovery. There is another obligation that the physician owes to the patient's family, which must not be lost sight of. That is, going into the physical condition of every member of the household and determining whether or not tuberculosis exists in any other member

of the family. Young children in particular should be examined, and if found undernourished, even though clinical tuberculosis cannot be demonstrated, they should be placed in preventoria if these are at all available, and if they are not, proper advice should be given and insisted upon.

Before I go further into this subject of the disposition of tuberculous patients, I wish to say that the most important one thing in the treatment of tuberculosis is *intelligent guidance*. The burden of this responsibility rests primarily with the general practitioner, and secondarily with the tuberculosis specialist. By "tuberculosis specialist" I mean the man who treats these patients in an institution according to the recognized principles for such cases, which are the application of nature's processes aided by such medicinal and surgical measures as are applicable in individual cases. Later in this paper I shall enumerate some things which are valuable in treating these cases; however, before doing this I wish to go into detail regarding the disposition of tuberculous patients.

Beginning with the man who makes the diagnosis, just as soon as this is made, the question uppermost in this man's mind should be, "What institution is it possible for this patient to enter?" First, is he able to enter a private institution, and is he financially able to stay a sufficient length of time to get an arrestment of his trouble? If not, is he eligible to the state institution? If so, is his disease too far advanced to get an arrestment of his trouble in six to nine months? If not, what is available? Treating these cases in the home should be the last consideration. The greatest of all endorsements of the institutional treatment comes from the advocates of home treatment. They all try to imitate the institutional regimen. This, however, except in rare instances, is a very poor imitation. In an institution everybody connected with the place is working for the same end; all the activities of the place take into consideration the best interest of sick people.

On the other hand, in the home all the other people are well and things are provided for well people, and it is almost impossible to follow a definite regimen. In order to get permanent results in a case of tuberculosis it is necessary to drill into the patient the fundamental principles upon which an arrestment of his disease depends, make him realize that these principles offer him his salvation, teach him that it is these things that produce results and not any particular kind of medicine that he might be taking at the same time. If this medicine helps, which is oftentimes the case, well and good; but let us give each measure instituted in this case its due credit. This is very important. To illustrate:

if a particular patient is taught and educated that it is tuberculin that is doing the trick, when at the same time he is resting conscientiously and observing the other rules of living, this patient is being done a grave injustice, in that when the acute stage of the disease has passed he is going to rely on tuberculin, the *sine qua non*, and thereby come to grief. Of course, tuberculin is used here as an illustration. Many other medicines, some of which are really valuable aids, are being held up to the patient as cures for tuberculosis.

Here I want to illustrate this principle with a case at Woodlawn at present. Mrs. B., admitted October 3; age, twenty-seven; weight, 93; temperature, 99.6; pulse 100 to 110; respiration, 20 to 28; annoying cough; profuse expectoration; generally weak; chest examination, R. L., moist râles at apex, area of dulness extending to fourth rib front and back; L. L., moist at apex front and back, dry crackles at base. Re-examination December fourth, or two months after initial examination, showed weight 107, or gain of fourteen pounds; temperature normal; pulse 80 to 86; respiration 16 to 20; practically no cough; expectoration entirely stopped; patient much stronger. Chest examination same area of involvement; however, considerably dryer. This patient is getting well. I have never seen a patient show greater improvement in the same length of time at a health resort or anywhere else.

The treatment in this case has been strict regimen. On admission she was put to bed and kept there except for bath and toilet until her temperature became normal. Then for two weeks she was allowed up for meals and put right back to bed, with no reading. She was then allowed to sit up for two hours in the morning, read thirty minutes, and make her own bed; but was kept in bed the rest of the day except for meals. She is now up all day except during our morning and afternoon rest hours from 10 to 11.45 a.m. and 1 to 3.30 p.m. She has not taken any medicine except a laxative occasionally and milk of magnesia. It would have been an easy matter to have convinced this patient that the milk of magnesia, and not the rest, was responsible for her improvement, and so far as the present is concerned she would have been just as well off for the deception; however, when the final result came about she would have been materially wronged.

It is a very hard matter to get a patient to stay in an institution after he gets to feeling better, gains twenty or thirty pounds and his temperature returns to normal. Then, unless it has been sufficiently impressed upon him that it requires several months at best to arrest his trouble, he

thinks he is well, leaves the institution, goes back to his former way of living and soon breaks down again. In many cases it is very hard to prevent this, unless the family physician tells the patient when he leaves home that it is going to require several months at best to arrest his trouble; particularly so if he has told him that he will be all right in a few months. Naturally it is very difficult to get that first impression out of his mind, and it is perfectly natural and right that a patient should believe a man who has practised in his family for years in preference to a stranger.

After these patients have been diagnosed and properly directed by attending physicians and have been admitted to a sanatorium, the sanatorium physician's responsibility begins. The first requisite is to go into the case in a most thorough way, not only with regard to the extent of involvement and the patient's resistance, but note any individual peculiarities of this particular patient; also, any complications, proper provision being made for each of these. Teach this patient the proper attitude toward the disease—in other words, to take himself just seriously enough and not too seriously. Teach the essentials in the treatment of tuberculosis, and not only this, but *see that patients observe them and realize that in order for them ever to be restored to usefulness they must continue to observe these principles for a long time.* Teach them the value of out-door life, sunshine, good food, rest and exercise, and how to use them, particularly when rest is indicated and when exercise is indicated. I am confident that it is never a mistake to tell a patient just exactly your findings in the case, and just as nearly as possible his chance for recovery. The physician who makes dogmatic statements to patients with regard to his curing a case of tuberculosis with a certain kind of medicine or any other one measure he uses in its treatment, is, to put it lightly, a man who verifies his statements very infrequently. In the present state of our knowledge of tuberculosis, no man can with discretion make a positive statement regarding the results to be obtained in any case. To even an incipient case, as far as we are warranted in going is to say that provided he takes the treatment for a sufficient length of time it is reasonably certain that he will get results.

The measures recognized as being effectual in the treatment of tuberculosis are well known as "nature's processes:"

1. Rest.
2. Good food.
3. Fresh air and sunshine.
4. Graduated exercise.

And the proper application of each, particularly rest and exercise, largely determines the results you are going to get in these cases. The measures which have aided nature's processes are:

1. Medicine.
2. Surgery.
3. Artificial pneumothorax.

All of these really play an important rôle. Sometimes the prescribing of a certain kind of medicine will relieve a condition which is really hindering the patient from recovering. In order to get results in a case that is losing ground, something must happen to change the order of things if this patient is going to do well. Sometimes surgery will relieve a condition which is preventing the patient from improving; sometimes change of climate, but the main thing is to determine what is needed and apply the right thing.

To recapitulate:

1. Just as soon as the diagnosis is made, give proper, intelligent and very definite advice.
2. Place the patient in an institution most suited to this particular case.
3. Make careful examination and observation of every other member of this household.
4. Educate the patient.
5. Give proper credit to each measure used in the treatment.
6. Take care of complications.
7. Teach the patient the early symptoms of tuberculosis so that he may recognize or suspect beginning cases in his own family or friends after returning home and refer them to a physician for examination.
8. After the disease is arrested give very definite advice or instructions regarding after life.

This is treating tuberculosis.

But when we make a diagnosis and tell the patient to go West and rough it, or to go home and go to bed, or to go to some institution without looking into the problems which confront us in sending a patient to an institution and without selecting the institution fitted to this particular case; as for instance, to send a case with a definite uncompensated heart lesion to an altitude of four or five thousand feet: or tell the patient that he will be well in two or three months, or we will cure him for a certain amount of money, or we can give him medicine or use any other one measure that will cure him:

This is mistreating tuberculosis.

A COMPARISON OF THE WASSERMAN REACTION AND THE SEROCHEMICAL REACTION OF BRUCK IN A TUBERCULOSIS SANATORIUM

H. J. CORPER AND L. FIALA

From the Laboratory of the City of Chicago Municipal Tuberculosis Sanitarium

In a previous investigation the Wassermann and luetin reactions (1) were compared in tuberculosis with a view to finding a simple substitute for the complicated Wassermann reaction for the diagnosis.of lues in the tuberculosis sanatorium and for this purpose the luetin reaction was found to be entirely inadequate, giving a large percentage (47 per cent) of unreliable results in definitely non-syphilitic negative Wassermann cases of tuberculosis. During the past year Bruck (2) collaborator of Wassermann and Neisser in the development of the complement fixation test for syphilis reported on the use of a simple serochemical test developed after a ten years' search for an easily performed diagnostic aid which seemed worthy of consideration. The test is based on the fact observed by him that the nitric acid precipitate in syphilitic serum dissolved more slowly on neutralization with alkali than the precipitate in normal serum. In the final development of the test he uses distilled water as the solvent in place of alkali. The only reagent necessary is the official pure nitric acid of the German pharmacopeia, his technic being based on one containing 24.77 grams nitric acid per 100 grams or 28.48 cc. nitric acid per 100 cc. with a final specific gravity of 1,149. He suggests that the acid be tested so that the exact amount is determined which, with normal serum, still gives a negative reaction.

The test is made by placing 0.5 cc. clear serum in a test tube, adding 2 cc. distilled water, and the whole is shaken. Then 0.3 cc. of the nitric acid is added and the whole again thoroughly shaken and set aside at room temperature for ten minutes. To this is added 16 cc. distilled water at room temperature (about 15°C), and closing the tube with the finger it is shaken carefully up and down three times, not vigorously enough to make it foam. This is repeated ten minutes later and the tube is set aside for one-half hour. By this time the precipitate with normal serum is entirely dissolved while syphilitic serum shows a distinct flocculent

turbidity which after two or three hours, or better still twelve hours, results in a gelatinous and characteristic precipitate on the floor of the test tube.

With this test on 200 syphilitics and 200 normals Bruck obtained almost concordant results with the clinical findings and the Wassermann. Only three Wassermann positive serums (one latent and two secondary cases) gave negative serochemical tests while one case of congenital syphilis and one tertiary case gave positive reactions with negative Wassermanns. The 200 non-syphilitics were negative except in four cases of old infected wounds of the knee and thigh (long febrile) and one febrile case of tuberculosis.

Smith and Solomon (3) used the Bruck test with slight modifications on 400 cases and found that their results disagreed with the Wassermann findings in 25 per cent of the cases, while on 302 non-syphilitics they obtained 28 per cent doubtful or positive reactions. In syphilis of the central nervous system, of which there were 69 cases, 14 per cent differed from the Wassermann while in 22 other syphilitics the two reactions differed in 23 per cent. Stillians (4) reports disagreement with the Wassermann in 25 per cent of a total of 209 cases. In 13 cases of active early syphilis, in all of which the Wassermann was strongly positive, the Bruck test was negative while 24 per cent of 74 non-syphilitics with negative Wassermann reactions gave positive Bruck tests. All the tests were carefully checked by repetition and Bruck's technic was followed in all respects except the time interval before reading which was from eighteen to twenty-four hours.

The results to be reported on in this communication were obtained from the residents of a tuberculosis sanatorium. The directions of Bruck in performing the serochemical reaction were followed to the letter, the nitric acid was diluted as described by him and specific gravity tests revealed it to be 1.149. This acid produced no undissolved precipitate with the sera of 5 normal individuals selected for this preliminary test. It was soon found, however, that in positive cases a wide range of different precipitates was obtained so that it seemed desirable to graduate the readings, so that differences in amounts of precipitate formed which might prove of significance would not be missed. This was done both on the basis of turbidity resulting in the entire liquid when shaken, and the resultant precipitate on the floor of the test tube. Since the two agreed well in every case the following method of reading was finally exclusively adopted: after closing the tube with the finger it is shaken up and down

three times carefully before reading and graded from − to + + + as follows:

−, clear with no precipitate on standing for twelve to twenty-four hours.

±, slightly turbid but no precipitate after twelve hours.

+, turbid and a precipitate after standing over two hours and persists.

++, turbid, precipitate settles after one-half hour and persists after shaking, 9 point type held behind tube can be read but is blurred perceptibly.

+++, very turbid, heavy precipitate settles in a short time and 9 point type cannot be seen.

The tubes used for the tests were all of clear white glass $\frac{3}{4}$ x $6\frac{1}{2}$ inches. All measurements of serum, acid and water were made in standard graduated pipettes.

The cases studied are classified according to the National Tuberculosis Association classification into non-tuberculous, questionably tuberculous, incipient, moderately advanced and far advanced.

	WASSERMANN POSITIVE				WASSERMANN NEGATIVE			
	Bruck positive			Bruck negative (or plus minus)	Bruck positive			Bruck negative (or plus minus)
	+++	++	+		+++	++	+	
Non-tuberculous		2		1		5	2	14
Questionably tuberculous				1	3	5	10	21
Incipient		1		1	2	7	5	25
Moderately advanced			2		12	14	16	26
Far advanced	2	1	1	3	9	14	9	15
Total	2	4	3	6	26	45	42	100

A glance at the tabulated figures reveals that: Of a total of 15 definitely positive (+ + or stronger) Wassermann reacting sera, 6 gave a negative serochemical reaction; of a total of 213 negative Wassermann reacting sera, 113 (53 per cent) gave a positive Bruck test. The percentage of positives was greater among the moderately advanced (63 per cent) and far advanced (70 per cent) cases than among the non-tuberculous (33 per cent), questionably tuberculous (46 per cent) and incipient (36 per cent) cases. There was no predisposition for cases with temperature (persistently over 100°F.) to give a positive Bruck reaction (of 45 cases with temperature, 18 gave negative tests). Cases dying of pulmonary

tuberculosis within three months of the time of making the test were found to give indiscriminately positive and negative reactions. The activity of the case was likewise of no significance.

CONCLUSIONS

The Bruck serochemical reaction for syphilis is unreliable as a test to supplant the Wassermann reaction in the tuberculosis sanatorium. As far as could be noted from the above observations it gives no data of value.

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THE RESULTS OF THE WASSERMANN REACTION IN A TUBERCULOSIS SANATORIUM

H. J. CORPER

From the Laboratory of the City of Chicago Municipal Tuberculosis Sanitarium

One of the most important clinical conditions from which tuberculosis must be differentiated is syphilis; this is true of pulmonary as well as of bone tuberculosis. The coexistence of the two diseases is also frequent, and early and proper consideration of syphilis will greatly aid in improving the coincident tuberculosis. The two most valuable diagnostic aids in differentiating or discovering the concomitant conditions are the Wassermann reaction and the X-ray findings, With a view to answering the often repeated questions, "What percentage of syphilis do you find in the tuberculosis sanatorium?" and "What percentage of your Wassermann reactions are positive?" the following statistical paper seems worthy of publication.

Before dwelling upon the findings to be reported it might be well to consider some of the most important recent investigations on the Wassermann reaction and the statistics obtained therefrom. The Wassermann reaction has outlived its critical experimental stage and is today accepted as one of the most valuable diagnostic methods for detecting syphilis. Schmidt (1) examined 233 cadavers and found that syphilis in any form could be detected by the Wassermann reaction with 94 per cent of certainty, comparative tests before and after death always harmonizing. He states that in cases of severe cachexia due to tumors, severe tuberculosis and severe sepsis, a very slight or incomplete complement fixation may occur but definite reactions never occur in these conditions. Graves (2) as a result of the study of 290 post mortem Wassermann reactions found that in 90.4 per cent of the cases showing post mortem anatomic lesions of syphilis or presenting positive evidence of syphilis in their histories, the sera post mortem gave positive reactions. Sixteen cases of pulmonary tuberculosis gave negative reactions. Ottenberg (3) in a excellent recent article states:

Divergent reports on identical serums sent to different laboratories undoubtedly occur and will continue to occur so long as laboratory workers con-

tinue to use widely different technical methods. These divergent results, however, should not shake our confidence in the clinical specificity of the Wassermann reaction. They almost invariably occur only in cases which exhibit weakly positive reactions, and they usually mean that one laboratory has succeeded in detecting a weakly positive reaction, while the other has not. In the great majority of cases which present definite positive or definite negative results the reports of different laboratories are practically uniform.

Snow and Cooper (4) have considered the Wassermann reaction in its relation to tuberculosis and as a result of a critical study of the reaction in 290 tuberculous patients conclude:

> That the percentage of non-syphilitic, tuberculous patients whose blood may bind complement with non-cholesterin zed antigens is so small as to be practically negligible. Complete complement fixation with non-cholesterinized antigen, in a tuberculous patient, is as adequate presumptive evidence of syphilis as it is in a non-tuberculous.

The literature contains references to the Wassermann statistics among different classes and races of people and naturally the percentages vary greatly, depending upon a number of circumstances; such as the social strata and the locality, as for instance the negro in the south. McNeil (5) of Galveston cites 34 per cent positive Wassermanns among the negro sick applying at clinics, while the incidence among healthy negroes is much lower (about 24 per cent) and among medical students it is almost nil, etc. Whitney (6) believes as a result of the examination of 7,885 dispensary patients in San Francisco that the figures obtained by him represent the incidence of syphilis in that locality. The percentage obtained by him is 6.9 per cent. He states that the Wassermann seems especially called for in all diseases of the nervous system, all circulatory diseases, including cardiorenal and renal, all bone and joint diseases, all diseases of the eye involving nerve, retina, choroid, sclera, iris, or lens, all liver diseases, all chronic digestive disorders, all tumors, all cases involving lymphatic enlargement, and all constitutional or metabolism diseases. Moore (7) obtained a higher percentage, 13.4, on charity dispensary patients but explains his high figures as due to the fact that his cases were the ailing members of a class of society which are more or less unfortunate in the struggle for existence. Walker and Haller (8) obtained 600 positive Wassermanns from 4000 general hospital cases in Boston but they used a cholesterolized antigen for their tests. They found, however, in spite of this that the common infectious diseases, typhoid fever, pneu-

monia, tuberculosis (90 cases of outspoken pulmonary tuberculosis), and scarlet fever did not cause falsely positive reactions.

A few articles have been published within recent years on the incidence of positive Wassermann reactions in tuberculosis dispensaries and sanatoria. Jones (9) examined 251 tuberculosis dispensary cases in Seattle,

TABLE 1

Males

	AGE																PER CENT POSITIVE*
	0–5		6–15		16–25		26–40		41–60		Over 61		Un. known		Totals		
	+	−	+	−	+	−	+	−	+	−	+	−	+	−	+	−	
American		9	3	37		59	7	83	9	27		2		6	19	223	7.8
Austro-Hungarian		4	1	5	2	10	7	30	1	5		1		3	11	58	15.9
Bohemian		1	1	4	2	16	3	30		5		1		1	6	58	9.3
Canadian		1		1			1	7		1					1	10	
Danish		1				2	1	3		4					1	10	
English		1		3		6		12	1	11				1	1	34	
Finnish				2						2						4	
French				1	1	4		5		1					1	11	
German		7	1	28	1	39	9	76	1	17		4		1	12	172	6.5
Greek		2		1		6		3								12	
Irish			1	18		39	7	72	3	35		3		2	11	169	6.1
Italian		3	2	16		14	1	13		11				4	3	61	4.7
Jew		6	1	21	3	41	4	39	2	16				2	10	125	7.4
Lithuanian			1	8	1	5	1	7		1					3	21	
Negro			1	10		6	1	11	1	2					3	29	
Norwegian		1	1	2	1	8	1	17	1	10					4	38	
Polish		3	2	24	3	32	1	43		13		1		1	6	117	4.8
Russian						5	2	9				1		3	2	18	
Scotch				6		4		15		5	1			1	1	31	
Swedish	1	1	1	2		25	4	19		23				2	6	72	7.7
Unknown		2						1		1						4	..
Totals	1	42	16	191†	14	327‡	50	501§	19	193**	1	13		27	101	1294††	7.2

* Percentages are only given where a total of at least 50 cases is represented.

† This includes two Hawaiians not listed in table.

‡ This includes one Armenian, one Belgian, one Persian, one Servian, and two Spaniards not listed in table.

§ This includes one Australian, one Belgian, two Dutch, one Roumanian, and one Spaniard not listed in table.

** This includes one Turk and two Welsh not listed in table.

†† This includes the cases noted in †, ‡, §, and **.

Washington, and found that 14 per cent of all the cases gave a + + + reaction, 20 per cent a + + or stronger, and 29 per cent a + or stronger.

One hundred and eighty-nine of these cases came from the public sanatorium where a Wassermann is a part of the routine examination and the figures on these were 11 per cent, + + +; 17 per cent, + +, or stronger; and 25 per cent, +, or stronger. By nationality 66 per cent of the cases

TABLE 2

Females

	AGE																
	0–5		6–15		16–25		26–40		41–60		Over 61		Unknown		Totals		PER CENT POSITIVE*
	+	−	+	−	+	−	+	−	+	−	+	−	+	−	+	−	
American	1	8	1	52	4	98	8	69	1	12		2		1	15	242	5.8
Austro-Hungarian		3	1	15		21	2	14		4				2	3	59	4.8
Bohemian			1	11	2	24	1	20		3				1	4	59	6.3
Canadian							1	3		1					1	4	
Danish						2		4	1						1	6	
English		1	2	1		7		17	1	5		1			3	32	
Finnish				1		1		2		1						5	
French						4	1	5		2					1	11	
German		6	3	29	1	56	4	94	3	15		1			11	201	5.2
Irish		1		12	1	46	4	53	2	20				1	7	133	5.0
Italian		4	3	41	1	22	1	13		4				1	5	85	5.5
Jew		1	1	20	4	35	4	59	1	16				4	10	135	6.9
Lithuanian				8	1	8	1	4							2	20	
Negro		1		6		9	3	12		1					3	29	
Norwegian		1		4	1	9		13	1	1					2	28	
Polish		3	1	27		44	3	38		2		1		1	4	116	3.3
Russian						1		1		1				1		4	
Scotch			1	3		5	3	11	1	2					5	21	
Swedish		1		15	1	24	1	50		7					2	97	2.0
Welsh				1		2		1		1						5	
Unknown				4	1	3		1							1	8	
Total	1	30	14	251†	17	426‡	37	494§	11	100**		5		13††	80	1319‡‡	5.8

* Percentages are only given where a total of at least 50 cases is represented.

† This includes one Belgian not listed in table.

‡ This includes two Belgians, one Mexican, one Persian, and one Swiss not listed in table.

§ This includes one Bulgarian, two Dutch, one Greek, one Portuguese, two Servians, one Spaniard, and two Swiss not listed in table.

** This includes one Dutch and one Servian not listed in table.

†† This includes one Persian not listed in table.

‡‡ This includes the cases noted in †, ‡, §, **, and ‡‡.

were American born and 44 per cent foreign. The positives were uniformly distributed. Lyon (10) of Rutland, Mass., reports obtaining 6

per cent positives from 471 patients (10 cases gave doubtful and 2 unsatisfactory results). The positive findings were in 10 incipient, 15 moderately advanced and 4 far advanced cases. Ford (11) of the Gaylord Farm Sanatorium, Wallingford, Conn., reports the examination of 328 sanatorium patients, 92 per cent of which gave a negative result on the first examination; and 16 (5 per cent) that were one or two plus the first examination gave a negative result the following week and were always negative thereafter. In 3 (1 per cent) sera that were + + + the first examination were reported negative two weeks later and remained so afterward, while 7 (2 per cent), showed a three or four plus Wassermann persistently positive. Petroff (12) reported only 9 positive reactions out of 376 cases at Trudeau Sanatorium, New York, when using the non-cholesterolized heart antigen.

The patients to be reported on in this paper were all consecutive residents of the City of Chicago Municipal Tuberculosis Sanitarium, during September, 1915, to November, 1917, where a routine Wassermann is made on every patient without discrimination.

The patients before being admitted to the sanatorium have all passed through the hands of well trained dispensary physicians and must have presented some evidence of the presence of tuberculosis of some type. The patients as a whole are fairly representative of the population of Chicago including people of all classes and nationalities, the admissions being restricted to residents of the city. In performing the complement fixation tests the regular non-cholesterolized beef heart antigen and the Noguchi human hemolytic system were used. The positive reactions tabulated were only definite positive complement fixations of + + or stronger.

SUMMARY

As a result of the routine serological blood examination of 1395 men and 1399 women residents of the City of Chicago Municipal Tuberculosis Sanitarium, a definite positive Wassermann reaction was obtained in 7.2 per cent of the men and 5.8 per cent of the women.

The incidence of a definite positive Wassermann reaction, as far as this could be determined, did not reveal any striking differences from the above figures resulting from a classification of the cases according to different ages or different nationality or race.

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EDITORIAL

SAFETY FIRST PHILOSOPHY FOR THE TUBERCULOUS

Besides the stigma of it many difficulties beset the man who has an arrested tuberculosis. One doctor tells him never to take a chance; another looks grave, ponders, and gives him a qualified approval of his plans for work or play. He tells him to make a trial and if he will be judicious and careful (whether or not by temperament he lacks these qualities) there is a good chance for him.

There are few standards to guide him, for he cannot measure his "tolerance" like the diabetic who can be taught the sugar test. For him there appears only the proverbial mushroom test, whereby one must eat to find perchance a poisonous toadstool. Thus such a patient must often test his defenses against a further spread of tuberculosis after months spent in the rest cure.

He has the alternative of an idle life, useless and usually poverty-stricken or burdensome to his folks, or he must venture along a risky path, watching for symptoms of relapse, too often serious when once begun. The idler, on the other hand, is none too safe, as physical and mental deterioration may ultimately destroy him like rust on a blade. Plainly there is for such a man only the middle ground, which he must find for himself and be vigilant and self-controlled.

Tests do not yet exist to show us how well healed the tuberculous tissue has become, or where a potential source of hemorrhage may lurk in the blood vessels. We can only point to the percentage of relapses in a given type of the disease in estimating the chance of a breakdown, a rule which may not apply to an individual case; for no disease furnishes more surprises and exceptions to percentage rules. The experience in the great war will, in all probability, illustrate this fact on a large scale. There are many individuals in whom tuberculosis of slight extent has produced no symptoms that have been noted. There appears to be no loss of health when tuberculosis is first discovered by routine medical examination, often confirmed by X-ray examinations under modern conditions. It is not unreasonable to consider such persons as having already demonstrated their physical fitness to continue their occupa-

tions; at least routine rest treatment appears superfluous at the time the presence of tuberculosis is discovered. These instances are becoming more frequent the further the examinations of army recruits are carried and the more the refinements such as the X-ray are used for confirmation. If it is granted that in the United States 2 per cent of the men between 21 and 31 are to be definitely rejected from military service for tuberculosis, a still larger number must be discoverable. Whether or not these are fit for military service is debatable; for some will break down, while others do stand a large amount of strain and exposure in civil life and probably will keep well in the army. Unless it can be shown that an excessive percentage becomes disabled, as compared with civilians in the same condition, they are likely to be accepted for the military services without much question.

The problem of advice to these arrested tuberculous persons is also one of growing importance and it cannot be met by an attempt to place them all under treatment. They should receive an education and not be discouraged from pursuing their usual vocations unless these are frankly hazardous. Intelligent caution is sufficient and until the attitude of the public is more reasonable and less hostile to the tuberculous, such instruction ought to be as free from publicity as possible. Much distress of mind may thus be prevented, and the knowledge or the accidental discovery of the disease will lose some of its dread significance to the hitherto unsuspecting individual.

E. R. B.

MEDICAL NOTES, ABSTRACTS AND REVIEWS

It will be the eventual purpose of the REVIEW thoroughly to canvass all literature on tuberculosis as it appears in other medical periodicals and to present it in abstract form. Authors are requested to send abstracts or reprints of their papers to the Abstract Editor, Dr. George Mannheimer, 41 West 51st Street, New York, N. Y.

Immobility of the Diaphragm.—The importance of the diaphragm as an organ has been much overlooked, and very little has been studied of the diseases to which the organ is subject either primarily or secondary to disease of adjacent structures. We must remember that the two domes are in several ways independent of each other. In addition to being a partition, as the diaphragm is usually referred to, it is also a sieve through which flows a rich lymph supply. Infection from sources in the abdomen involve the lung and pleura much more frequently than was assumed only a few years ago, and perplexing symptoms, particularly after operation in the right upper quadrant, are often explained by a subsequent infarct of the lung, a broncho-pneumonia, a pleurisy or an empyema. Fluoroscopy have enabled us to a closer study of the actions of the diaphragm. Under normal conditions we see the two sides of the diaphragm rise and fall in unison, and the two arches are divided at the pericardial attachments. The dissimilarity of sex becomes apparent in the movements of the organ during adult life. Women who have been trained to sing exhibit an excursion like that of the man who has learned to breathe. The normal position of the diaphragm is highest when lying, lowest when standing, and intermediary when sitting. Two spaces disappear, with few exceptions, during expiration and reappear during inspiration, the phrenicopericardial (the p. p. angle) and the phrenicocostal (p. c. sulcus). Both these spaces form a part of the pleural sac.

Injury to the diaphragm from disease is manifested by impaired mobility, and the chief cause is inflammation of the pleura. A dry pleurisy may fetter and limit the motion of the diaphragm by adhesions. Eighty-four patients who had had exudations into the pleural cavity have been studied. In sixty-two the serum or pus had been removed by aspiration or incision, in six the fluid disappeared by absorption. The interval between operation time and examination varied from one month to 19 years, the probable average being one and one-half years after operation. Sixty-six were over 15 years of age and eighteen ranged from 2½ to 11 years. Forty-seven had been afflicted with empyema, sixteen with pleuritic effusion, and twenty-one with exudative pleurisy and pulmonary tuberculosis. The results of a study of the mobility of the diaphragm in these cases were: The movements on the side affected were normal in fourteen, restricted in sixteen, and entirely lost in fifty-four. Empyema in the adult caused much more impairment of diaphragmatic function than in the child. Of thirty-two adults who had formerly had this disease only two recovered wth equal comparative movement on the affected side, twenty-six had complete unilateral immobility, and four had restricted motion. The damage to the lung and heart by pressure, adhesions, malposition was also increased in this group. The two who escaped permanent injury were aged sixteen and eighteen respectively. Three children who had had pleurisy with effusion were examined. Two had free movement and one had unilateral immobility. Fifteen children who had had empyema were studied between one month and two years after institution of drainage. Five revealed full mobility, seven complete immobility, and three unilateral restriction. Involvement of other organs is also decidedly less in the child. Of sixteen adults, three displayed full motion, four restricted movement, and nine entire immobility. None of these showed any evidence of pulmonary tuberculosis. Observations on twenty-one patients, subjects of pleurisy with effusion and pulmonary tuberculosis, showed complete unilateral immobility in eleven instances, entire bilateral immobility in one, restricted motion in five, and normal mobility in four instances. Sixteen of the patients were classed as incipient and five as moderately advanced. The amount of fluid in most

cases had been recorded as small. Of two cases of former spontaneous pneumothorax, only one showed restriction of motion of one leaflet. Three patients who had had prolonged artificial pneumothorax treatment showed immobility of the diaphragm on that side. In only three cases did the diaphragm show compensatory increased mobility on the side opposite the one affected.

Recovery from collapse and atelectasis of the lung was observed in all cases except five; the latter being confined to the lower lobe. In some cases, however, the immobility of the diaphragm caused the corresponding portion of the lung to expand very slightly. The danger to the heart and diaphragm is much greater than to the lung. The heart and lungs are not merely displaced by pressure. Loss of traction and elasticity of the affected lung and lack of inspiratory enlargement of the thorax constitute contributing factors. As regards prevention of damage to the diaphragm, early diagnosis of the presence of an exudate, the early evacuation of pus, the employment of the fluoroscope and the determination of the best site for drainage or aspiration are helpful factors. The lowest part of the chest, where the fluid collects in the costal sinuses, is the best place for drainage. Frequent changes of posture to promote gravity flow and the reverse Fowler position are worthy of trial. Too much collapse of the lung should not be allowed. Should it occur the employment of the pneumatic cabinet and Posher's method of deep breathing offer helpful adjuncts.—*Immobility of the Diaphragm, J. H. Pryor, Internat. Clinics, ii, Ser. 26.*

Subfebrile Temperature in Beginning Pulmonary Tuberculosis.—The author attempted to solve the question in which pathological conditions subfebrile temperatures occur. For this purpose he tried to gather information as to the fate of those patients, who, during their stay in the clinic ten years previously, had shown rises of temperature (98.8 to 100.2). Out of 400 patients, only 88 could be traced with the following result: In 41 per cent, pulmonary tuberculosis had already been diagnosed ten years ago. In 10 per cent a subsequent examination revealed tuberculous changes in the lungs. Therefore, in more than 50 per cent these subfebrile temperatures were due to tuberculosis. Of the first group, one-third had already died, of the second group, only one-fifth. The remaining patients who had shown subfebrile temperatures appeared to have suffered from the following conditions: ulcer of the stomach, chlorosis, neurasthenia and hysteria, constipation, states of exhaustion, muscular rheumatism. The conclusion is drawn that patients with subfebrile temperatures should be suspected of being tuberculous, but need not be subjected to a rigid régime, as long as they can be kept under observation for many years.—*Ueber die Bedeutung der subfebrilen Temperaturen fuer die Diagnose der beginnenden Lungentuberkulose, V. Schlaepfer, Zschr. f. klin. M., lxxxiii, 1916. H. 3–4, 159 (transl. from Internat. Centralbl. f. d. ges. Tub. Forsch., February, 1917, xl, No. 2, 47).*

New Sign in Pneumothorax and in Pleural Effusion.—In cases of pneumothorax or pleural effusion there exists a markedly diminished blood pressure in the leg as compared with that in the arm on the same side, a difference usually of at least 10 mm. and in many cases of over 20 mm. The most obvious explanation is, that when the pleural cavity is distended with liquid or with gas, pressure upon the aorta takes place, causing to a greater or lesser degree, corresponding diminution in systolic pressure distally to the compressed area.—*A New Physical Sign in Pneumothorax and in Pleural Effusion, Williamson, Lancet, July 7, 1917, ii, No.* 4197.

Reaction to Pinching of Muscle over Tuberculous Pleuropulmonary Lesion.—This so-called myotonic reaction is elicited by pinching the trapezius. Whatever the response, it is normally alike on both sides, and when it is exaggerated on one side only, it points to irritation of the muscle fibers from some cause. In an experience with 300 tuberculous patients, the myotonic reaction was more accentuated on the side of the active pleuropulmonary lesion. Congestion of the apex was always accompanied by exaggeration of the reflex, while it was always reduced with pleurisy without effusion. Of course sclerotic and other torpid lesions are not accompanied by the myotonic reaction, but it may be found an aid in locating a pulmonary focus, in estimating its depth beneath the surface, and whether it is active or not.—*La reaction myotonique du trapèze dans la tuberculose pleuropulmonaire, M. Loeper and H. Codet, Progr. Med., August 11, 1917, xxxii, No. 32, 265.*

Breath Sounds in Early Tuberculosis.—The object of the study was to ascertain the clinical importance of breath sounds in pulmonary tuberculosis with the hope of obtaining data for early diagnosis. A study was made of 124 cases of incipient disease confined to one or both apices, and the comparative significance of the respiratory changes was considered both alone and in

conjunction with other physical signs and diagnostic procedure. The writer desired the advantage of studying apical involvement alone instead of subjecting the patient to the greater physical strain of complete chest examination, because of the greater frequency of involvement of the apex. All conditions which might alter the character of the breath sounds at the apex were excluded. The findings are commented on at length, and the author reaches the following conclusions: "(1) Abdominal breathing is an effective method for the differentiation of granular breathing, from those extrapulmonary sounds simulating this type of breathing. (2) The observation of the time interval and force of the respiratory act is essential in the differentiation of physiologic from pathologic alterations in the duration and intensity of the respiratory murmur. (3) The lung glides across the auscultated field during respiration. (4) Variations in the force of the respiratory act may profoundly alter the character of the respiratory murmur in the region of the apices (5) Expiratory alterations predominate at the right apex, inspiratory at the left apex. (6) Prolonged expiration, when more pronounced at the left than at the right apex, is a reliable sign of disease at the left apex. (7) Broncho-vesicular breathing may be explained by contiguous areas of consolidated and aerated lung that alternately glide beneath the stethoscope during respiration. (8) The frequency with which alterations in the respiratory murmur occur over the healthy apex in unilateral disease deserves attention. (9) Physiologic respiratory modifications interpreted as pathologic represent the most frequent error in the physical examination in early tuberculosis. (10) A study of the breath sounds in early disease is often difficult and misleading, and for this reason should not be unduly emphasized in diagnosis."—*Breath Sounds in Early Tuberculosis, H. A. Bray, J. Am. M. Ass., November 24, 1917, lxix, No. 21, 1762.*

Physical Signs of Incipient Tuberculosis.—The advance in the laboratory methods or aids in the diagnosis of tuberculosis have aided, rather than established, the diagnosis of this disease. In the incipient stages, dependence must still be had on physical signs, elicited from the infected organs—the lungs or allied organs, especially the heart. The heart responds objectively more quickly to tuberculous infection of the lungs than even the lungs themselves. In health, for example, the aortic second sound is louder than the pulmonic second. In the incipient stage of tuberculosis the conditions are reversed,—the pulmonic second sound is louder than the aortic. While this reversal can be found also in mitral insufficiency and in mitral stenosis, these conditions can easily be ruled out, and then the accentuation of the pulmonic second sound remains almost pathognomic for incipient pulmonary tuberculosis. Besides, the pulse is always found accelerated at some period of the day or after some activity. Abrahams noticed that in about 80 per cent of his cases of early tuberculosis, the pulse was obliterated on the affected side when the arm was raised above the head. This condition was not found in advanced cases.

Inspection of the chest wall anteriorly reveals the fact that normally the right apex expands more than the left, and if the expansion of both sides is equal, suspicion may be directed toward the right apex. But actual retraction of the supra- or infraclavicular spaces is a sign of advanced disease, and not of incipient. In any event, however, it is unilateral retraction that is significant because bilateral incipient pulmonary tuberculosis is rather rare. The same relative significance must be accorded to fremitus. Fremitus in the right apex is normally better than in the left; equality points to disease in the left apex.

The significance of the percussion sounds is not absolute. It varies according to location. In certain parts dulness may be as normal as resonance in other parts. But in determining the kind of resonance, it is pitch and duration that count, but particularly the latter. Long duration means resonance, short duration means infiltration, while no duration means consolidation. But vesicular resonance is found normally below the left clavicle, below the second right interspace, in the axillary spaces, and over the lower ribs. Dulness is normal over the right apex, in the second right interspace—especially the outer half, the interscapular space between the seventh cervical and the fourth or fifth dorsal vertebrae, and over the deep area of the heart. Flatness is normal over the scapulae and the superficial areas of the heart. If, then, the left apex is as dull as the right, there is infiltration of the left; and infiltration of the right apex ought to give a dull-flat (Abrahams) sound. The crucial test of apical non-infiltration is the change from the dulness to vesicular resonance on deep inspiration. If there is infiltration, there will be no such change.

Normal auscultatory—vesicular—sounds are found in the left apex and below the left clavicle down to the base of the heart, in the axillary regions, over the lower lobes, and below the right clavicle. Broncho-vesicular breathing is heard over the right apex, in the

second interspace close to the sternum, and in the interscapular space. Broncho-vesicular breathing follows the lines of normal dulness. Bronchial breathing is not found over normal lung tissue; it is heard over trachea and larynx, and may be used for comparison. Vesicular breathing has a long inspiratory murmur and a short expiratory. In broncho-vesciular there is an equal length of both, but the pitch is higher. Tubular or bronchial breathing is characterized by very long expiratory murmur and high pitch, but, of course, this form of breathing is not to be found in incipient tuberculosis. The changes from normal to pathological lung by auscultation are progressive—from vesicular to broncho-vesicular to tubular. In the left apex the normal vesicular changes to broncho-vesicular, but in the right apex the prolonged expiratory murmur denotes advanced process. The spoken and whispered voices are more distinct as the cases progress away from vesicular breathing.

These masses of signs are mere guides. They must be marshalled and interpreted. It is the interpretation of the signs found on examination, perhaps much more than the mere discovery of them by the senses of an able examiner, that helps make the proper diagnosis. In tuberculosis it is proper diagnosis that saves life. It is a therapeutic measure of first importance, whether for the individual himself, for any unit of which he may be a member, or for society at large.—*Editorial, Boston M. & S. J., October 4, 1917, clxxvii, No. 14, 495.*

Delayed or Latent Tuberculous Infection.—In the experiments referred to by Delepine, the period of latency did not exceed three or four weeks, but it was sufficiently long to reveal processes of great importance, more especially in relation to latent infection. The fact that tubercle bacilli were still living and capable of a modified pathogenic action after being kept for nearly five hundred days in a natural tuberculous product (milk) supports the view that under certain circumstances tubercle bacilli are still infective after remaining dormant for a considerable period of time.—*Delayed or Latent Tuberculous Infection, S. Delepine, Brit. J. Tuberc., July, 1917, xi, No. 3. 107.*

Auscultation of the Apices in Young Men.—The observations reported here were made during a recent examination for tuberculosis of about 22,000 troops at Chickamauga Park by a board of tuberculosis examiners. During the course of the work numerous men were found to present certain crackling sounds during auscultation, especially in the supraclavicular fossae, which so closely simulated râles, that their identification became the most difficult problem that had to be solved. It was of importance to identify such sounds, because the board was authorized to disqualify any soldier who showed persistent moist râles in the upper lobes. During the latter part of the work the writer noted the frequency of adventitious sounds in the upper lobes in the examination of 819 men.

In 4 per cent of men examined crepitations were heard at or near one or more joints especially the scapular, costo-sternal, and sterno-clavicular articulations and the shoulders anteriorly.

In 2.8 per cent certain crackles, usually rather loud and explosive, were heard for one or more respirations at the apices, disappearing promptly during continued breathing.

In 2.07 per cent were found the persistent apical clicks or crackles of the type that had proved so confusing.

No description of the last-named group of adventitious sounds was found in the usual text-books on thoracic diagnosis. Bushnell refers to a brief description of such crackles noted by Rosenbach over 40 years ago. He found them most often in muscular young men and children.

Joint crepitations may often be recognized by their groaning or grating quality. Confusing scapular sounds may be eliminated by one of three procedures: (1) By having the subject fold his arms and grasp the opposite shoulders with his hands; (2) by having him, while standing, bend the trunk forward to a horizontal position and allow the arms to hang limply downward; (3) by having him grasp an object at a level about as high as he can reach and exert enough weight on his arms to fix the scapulae apart. Crepitations from the lateral sternal articulations may often be eliminated by having the subject throw his shoulders as far back as possible.

Transient apical crackles, originating probably in the neck muscles, are often easily recognized by a loud, explosive quality. They are seldom reproduced by coughing.

The persistent apical crackles in healthy men are more difficult to distinguish from true râles than are any other adventitious sounds in the upper lobes. They are of every size, and occur singly or in sequence. Single clicks are usually of this type. All such crackles are most often heard when the subject holds his head in the position customary during examinations—slightly averted from the apex under examination. Such sounds often disappear if the chin is placed high in the air or if it is turned slightly toward the side that is being examined. These crackles are seldom increased by coughing, and usually occur during inspiration, but may be present in both

phases of respiration. They are usually more intense when the stethoscope is directed medially toward the neck muscles. Rosenbach reproduced such sounds by moving the neck muscles while the subject held his breath. Apical crackles of the above types almost certainly originate in the neck muscles and are of significance only in being differentiated from intrapulmonary râles.—*Auscultation of the Pulmonary Apices in Young Men,. W. J T. King, Mil. Surg. January, 1918, xii, No. 1.*

Pulmonary Puzzles.—A variety of acute and subacute pulmonary infections simulate tuberculosis. We find a somewhat protracted period of malaise, cough, sputum, slight intermittent fever and physical signs in the lungs. The latter consist chiefly of râles, heard usually at the bases, but also at times at the apex of one or both lungs. Some of these cases have been diagnosed as tuberculosis. The following factors are to be considered in the differential diagnosis. The history is negative. The physical signs are abundant while the symptoms are comparatively mild. The pulse is slow. The sputum is not characteristic and contains the influenza bacillus, the streptococcus and the pneumococcus. In order to determine what constitutes pulmonary tuberculosis in the absence of a positive sputum, the following definitions and diagnostic standards are given.

1. *Loss of Weight.* By "loss of weight" should be understood any unexplained loss of at least 5 per cent below normal limits for that particular individual within four months' time.

2. *Loss of Strength.* By "loss of strength," in its pathological sense, is meant undue fatigue and a lack of staying power, which are unusual for the individual patient and which cannot be satisfactorily explained.

3. *Fever.* An occasional temperature of 99° should not be considered "fever." A temperature which persistently runs over 99° when taken at least four times a day over a period of one week (by mouth five minutes) should be considered of significance and to constitute "fever."

4. *Elevation of Pulse.* When the average normal pulse of the patient is already known, an elevation of 15 beats per minute, when the pulse is taken quietly at home during various periods of the day, should be considered abnormal. In cases where the average pulse is not known—and of course this constitutes the majority of cases—one should consider an average pulse of 85 or over in men, and 90 or over in women, to be abnormal. The combination of a subnormal temperature and an elevated pulse, as defined here, should be considered of great importance.

5. *Hemorrhage.* Any amount of expectorated blood, with or without sputum, requires medical investigation as to its source. Blood streaks, blood spots, etc., may or may not mean tuberculosis. On the other hand, a hemorrhage of one or two teaspoonfuls is presumptive evidence of the disease.

6. *Family History.* An occasional case of tuberculosis in the patient's uncles, aunts, cousins, etc., should not be considered of importance. It is an important fact when the patient's immediate relatives, such as brothers, sisters, father, mother, or grandparents have been tuberculous.

7. *Exposure.* Childhood exposure is of the greatest importance. Moderate exposure among normal, healthy adults of cleanly habits, is of less importance. Of course prolonged contact with unhygienic habits or surroundings may be a dangerous factor at any age.

8. *Cough.* There is no cough characteristic of tuberculosis. Every cough that persists for six weeks or over requires investigation. Tuberculosis may exist without any cough whatsoever.

9. *Sputum.* The presence of sputum is not necessary for a positive diagnosis. Constant sputum, with or without cough, requires investigation. Absence of bacilli in the sputum after one or several laboratory examinations is not necessarily proof against the presence of tuberculosis.

10. *Hoarseness.* Any hoarseness or a persistent "huskiness" requires investigation.

On a basis of these definitions the following minimum standards in the diagnosis of pulmonary tuberculosis have been formulated:

1. When constitutional signs and symptoms and definite past history are absent or nearly so, there should be demanded definite signs in the lungs including persistent râles at one or both apices. By "persistent" it is meant that the râles must be present after cough at two or more examinations, the patient having been under observation for at least one month.

2. In the presence of constitutional signs and symptoms, such as loss of weight and strength, etc., as defined above, there should be demanded some abnormality in the lungs, but not necessarily râles.

3. Usually a process at the apices should be considered tuberculous and a process at the base to be non-tuberculous until the contrary is proved, excepting when a clear history of pleurisy is present.

4. A hemorrhage, as defined above, is evidence of active pulmonary tuberculosis until the contrary is proved.

5. One should consider a typical pleurisy with effusion as presumptive evidence of

tuberculosis. One should also consider a dry pleurisy evidence of slight tuberculosis.

6. Pain in chest and shoulders, night sweats, digestive disorders, etc., may be present, and should be investigated.

7. In every doubtful case one should demand that the patient be kept under observation for at least one month, with repeated sputum examinations, before a definite diagnosis is made.—*Pulmonary Puzzles, J. B. Hawes, Boston M. & S. J., December 29, 1917, clxxvii, No. 26, 912.*

On Physical Examination.—Most of the active cases of chronic pulmonary tuberculosis can be arranged pathologically in three subdivisions: chronic parenchymatous, peribronchial, and hilus tuberculosis. Many cases of apical disease are secondary to old infections at the hilus. Of the methods employed in physical examination inspection is least appreciated by physicians. When properly done it will be of great help in many cases of incipient tuberculosis. Lagging of the upper front of the chest was revealed by this method in 43 per cent of the author's cases. This lagging occurs before there is evidence of retraction of the chest wall; the latter being a sign of old lesion. Lagging of an apex indicates active disease, while retraction is evidence of an old lesion. Lagging of the lower part of the chest is usually due to pleurisy. Atrophy of muscles is also a sign of an old lesion. Spasm of muscles occurs about an active lesion and can sometimes be noted on inspection. The reason why the value of percussion is not sufficiently recognized is that heavy percussion is generally employed. Light percussion is of great value for certain purposes as in apical percussion, mapping out cardiac dulness, ascertaining the lower borders of the lungs, etc., but it must be admitted that percussion is not a method of precision, as slight or questionable dulness is of no value and must be disregarded unless it is supported by other signs. The mastering of light percussion, nevertheless, will be found of much value in the diagnosis of pulmonary and cardiac diseases. Any definite dulness over the right apex should be regarded with suspicion; with light percussion no dulness can be found over the right apex in normal cases. Dulness over the inner third of the clavicle on very light percussion is an early sign of apical tuberculosis.—*The Physical Examination in Pulmonary Tuberculosis, J. H. Pratt, Boston M. and S. J., April 18, 1918, clxxviii, No. 16, 519.*

Charting Physical Signs in Lung Disease.—Zueblin uses a set of abbreviations and symbols for indicating the nature and extent of physical pulmonary signs. He found this method satisfactory because it shows at a glance the range of distribution of the various signs, thus facilitating observation of the course of the disease, and has the advantage over most methods employed in text books which use special symbols not present in an ordinary stock of printer's type.

Following are some of the abbreviations:

R. = right; l. = left; L. = lung; A.= apex; B. = base; up. = upper; md. = middle; lw. = lower; ant. = anterior; post. = posterior; ax. = axillary; mam. = mammillary; scap. = scapular; cl. = clavicular; Isp. = interspace; Rb. = rib; Spcp. = spinal cervical process; Sppd. = spinal dorsal process; Ispnd. = interspinous dorsal notch; F. = fossa; InclF. = infraclavicular fossa; SclF. = supraclavicular fossa; SscapF. = suprascapular fossa; IscapF. = infrascapular fossa; ItscapR. = interscapular region; agscap. = angle of scapula; MSL. = midsternal line; PstL. = parasternal line; MCIL. = midclavicular line; MML. = mammary line; AxL. = axillary line; aAxL. = anterior axillary line; mdAxL. = midaxillary line; postAxL. = posterior axillary line; ScapL. = scapular line; mdScap. = midscapular line; retr. = retracted; protr. = protruding; Ex. = expansion; — = diminished; + = increased; Rex. = respiratory expansion; TF. = tactile fremitus; VF. = vocal fremitus; Ppt. = palpation; P. = percussion; —1. = slightly diminished; —2. = dull; —3. = flat; +1. = slightly increased; +2. = marked increase; +3. = hyperresonant; Pt. = tympanitic percussion; Pcp. = cracked pot percussion; Pp. = palpatory percussion; —1. = slightly diminished; —2. = markedly diminished; Pn. = normal percussion; Resp. = respiration; Respp. = puerile respiration; Respv. = vesicular respiration; Respb. = bronchial respiration; Respind. = respiration indefinite; Respabs. = respiration absent; Insp. =inspiration; Inspgr. = inspiration granular; Inspw. = inspiration wavy; Inspcw. = inspiration cog wheel; Inspirr. = inspiration interrupted; Exp. = expiration; h. = harsh; ↘. = low pitched; ↗. = high pitched; ⌒ = prolonged. Resp. 1/2 = expiration double length of inspiration; 3/1 = expiration one-third of inspiration; Expb. = expiration bronchial; E pt. = expiration tubular; Expta. = expiration tubular amphoric; Expmus. = expiration musical; Rl. = râles; Rlcr. = crepitant; Rlmc. = mucous râles; Rlss. = sibilant râles; Rlmdmc. = medium sized mucous râles; Rlmet. = metallic râles; diff. = diffuse; sct. = scant; →. = as far as; Rlmus. = musical râles; Rlcs. = consonant râles; Rlgg. =

gurgling râles; Rlac. = râles after coughing; Fr. = friction rub; Bph. = bronchophony; Pec. = pectoriloquy, with intensity 1, 2, 3, etc.; Rlq. = an increase in intensity of râles whilst patient is whispering; Egph. = egophony; Hipp. = Hippocrat succussion; CS. = coin sound; PtS. = post tussis suction.—*Methods of Charting Physical Findings in Lung Diseases. E. Zueblin, Arch. Diag., October, 1917, x, No. 4, 374.*

Topographic Percussion.—For the diagnosis of chest diseases we must resort to all available means to secure the diagnosis, and as often as permissible should urge a post-mortem examination in fatal cases. Palpatory percussion should be taught to the under-graduate and post-graduate student. We must try to ascertain the extent of the lesion and not rest content with the diagnosis of pulmonary tuberculosis. With the proper technic of palpatory percussion we can approach very closely the post-mortem changes as far as the involvement is concerned. As to the cause of the change in the resistance and in the character of the percussion note we are frequently unable to determine in vivo by percussion alone whether the dulness is caused by pleuritic adhesions, nodular tubercles, or bronchopneumonic caseous tuberculosis, or by oedema. The spread of the tuberculous process into the apices of the lower lobes is recognizable or suggested by a distinct triangular area of dulness in the interscapular space similar in shape to Grocco's sign in pleurisy, with possible auscultatory signs present.—*Topographic Percussion of the Chest Compared with Post-Mortem Findings, E. Zueblin, Arch. Diag, October, 1917, x, No. 4, 380.*

The Coin Test in Pleurisy.—This test deserves more attention than it generally receives, as it affords one of the best presumptive indications of pleural effusion, and its simplicity commends it to the busy practitioner. The examiner's ear is applied at a point on the chest opposite to that at which the coins are being struck, and the ear not used in listening should be closed with the finger. Through healthy or normally aerated lung tissue the sound heard seems distant and dull, while over fluid or homogeneous solid tissue, a sharp, clear, silvery, metallic sound is noted. Generally there is a definite line of demarcation between the sound heard over lung tissue and that over fluid. Over the lower portion of the right lung the liver, being homogeneous and solid, may yield the metallic sound even in the absence of effusion. This sound also occurs physiologically at the base of the left lung, where the coins are struck over the area of cardiac dulness. The sign is, therefore, not reliable below the point of intersection of the tenth rib with a vertical line midway between the spinal column and the posterior axillary line. It is best to place the coin over the lower end of the sternum, or even in the supraxiphoid fossa, in or slightly to the left of the midline. Meanwhile, the examiner listens posteriorly over both lungs in alternation, at successive points covering the entire length of the organs. Exceptionally in very large effusions the sign may be absent. Again, a positive test may be obtained where the lung is consolidated in its entire thickness, and in rare cases of encysted pleurisy with old, firm adhesions binding down the lung. Generally, however, the positive test means a liquid effusion, and the level at which it becomes negative shows the height of the fluid, especially upon listening within the inner margin of the scapula. Often the test reveals fluid where the first or second exploratory puncture has been negative. The author has lately found it very useful in the detection of hemothorax following wounds of the chest. Often it showed the upper limit of the bloody effusion.—*Le signe du sou dans les pleuresies, P. Lereboullet, Paris, Med., January, 1918, viii, No. 1.*

Physician and Nurse in Tuberculosis Work.—In an idealized plan for controlling tuberculosis the following factors should play important parts: Elimination of sources of infection, both human and bovine. Education of the public, and particularly of children, in methods of right living and proper hygiene. Early diagnosis of clinical tuberculous disease in adults and children. Sanatorium treatment for the education and care of favorable and suitable cases. Hospital treatment for the care and isolation of advanced. progressive cases. Supervision of the tuberculous patient before and after leaving an institution, and at all times if the patient does not, or can not, have institutional care. Each of these factors is discussed. As regards the first, the elimination of bovine sources of infection is largely a state or administrative problem, but when there is any question as to the cleanliness of the milk supply the physician may well advise pasteurizing the milk and the nurse can give instructions how to do it. The elimination of human sources is more difficult, but much can be accomplished by the strict investigation of the families of patients. The physician has a definite responsibility to instruct the parents of the children, and the children themselves, concerning the methods of right living and hygiene, while the oppor-

tunity for the nurse to do good in this direction is almost unlimited. The early diagnosis of clinical tuberculous disease is a subject in which sanity and common sense are much needed. One must make a distinction between tuberculous infection which most of us have, and tuberculous disease which most of us have not. Hawes is constantly unmaking diagnoses of consumption and trying to overcome harm done in this direction, while on the other hand too many cases of incipient pulmonary tuberculosis are still unrecognized. His experience with the tuberculosis problem as a whole has led him to feel that home treatment can not, and should not, take the place of sanatorium treatment among the poorer classes, if the latter is in any way available. Every tuberculous patient, as far as it is possible, should, at some time, have sanatorium treatment, but the patient's sojourn in a sanatorium should be looked upon as an incident of greater or lesser importance in a course of treatment, the most important parts of which come before his entrance and after his departure from the sanatorium; the responsibility of the physician and nurse does not end when the patient is admitted to a sanatorium or hospital.—*The Value of the Physician and the Nurse in Social Service Work in Tuberculosis,, J. B. Hawes, Boston M. & S. J., March 21, 1918, No. 12, 381.*

The Specialist and General Practitioner.—There should be a closer coöperation between the general practitioner and the specialist in the treatment of tuberculosis. The general practitioner's duty is to make an early diagnosis. He will do better in this line by a close study of the symptoms than by the search of fine physical signs. He should see that his tuberculous patient has rest in bed, fresh air, sunshine, well-mixed diet of moderate amount, optimism and frankness. Opiates are often indicated for uncontrollable cough and hemorrhage, but a continuous hemorrhage can often be best relieved by artificial pneumothorax. Rest will cure the night sweats, cough and pains in the chest; it will also decrease the sputum, stop all toxic symptoms, and nature will assist in the ordinary case by developing fibrous walls around the tubercles and calcifying the necrotic areas. The specialist will supplement the above treatment with the use of artificial pneumothorax, tuberculins, vaccines, laryngeal treatments, surgery and graduated exercise.—*The Modern Treatment of Tuberculosis, H. F. Gammons, Boston M. & S. J., April 18, 1918, clxxviii, No. 16, 532.*

Occupational Treatment.—Properly regulated work is highly beneficial to the sufferer from pulmonary tuberculosis, provided that the greatest care has been exercised in the selection of the work and that the patient coöperates willingly. Even patients who are confined to bed seem to progress more rapidly when allowed to fill out part of the day with some interesting finger work, instead of lying still and brooding over their lot. Contrary to expectation, relapses have been less than two per cent among the patients thus treated under the writer's care, and in a year there has been only one small hemorrhage following exposure to the workshop. While the vocational training does not make a man a wage-earner in a new field, it has in many cases started new lines of thought regarding the life to be led after discharge, and stimulated not a few patients to improve themselves and become more useful citizens. Occupation has improved the morale of the men remarkably. While the results of treatment do not show any marked change from those obtained in civilian sanatoriums, they are decidedly better than those obtained during the first year of military work. A comparison of the large percentage of men who refused treatment last year with the very small number now applying for release furnishes strong evidence that the men appreciate this method of loosening nervous tension and making the prolonged and tedious treatment bearable. A fourth word should be added to the code for the treatment of pulmonary tuberculosis, which would then read, rest, fresh air, good food, and work.—*Vocational Training in the Treatment of Pulmonary Tuberculosis, T. R. Beyers, Can. M. Ass. J., January, 1918, viii, No. 1, 1.*

Work for the Tuberculous.—In a recent number of the Bulletin we commented on the important problem of providing suitable remunerative employment for those physically handicapped by disease, and mentioned briefly the excellent work done in this direction by the Committee on the Care of the Jewish Tuberculous.

A somewhat related problem is the oft-debated question of providing suitable occupations for patients in tuberculosis sanatoria. As our readers perhaps know, in some sanatoria the patients do practically no work of any kind and sit in the fresh air in reclining chairs by the hour. This plan has been well characterized by Doctor Biggs as tending to convert a self respecting consumptive working man into a fairly healthy loafer. Accordingly in the administration of the Municipal Sanatorium at Otisville, New York, the "work cure" plan inaugurated by Doctor Biggs, is in operation and each patient is expected to do some useful work.

In addition to his special work assignment, each patient is compelled to make his own bed, keep his portion of the shack tidy, fetch water, etc.

An excellent bit of constructive work along this line has been done in Edinburgh by Sir Robert Philip. Realizing the need of making suitable provision for patients discharged from tuberculosis sanatoria, Philip, in 1910, established the Royal Victoria Hospital Farm Colony, as complementary to the Sanatorium, and with a view to affording a simple means, economically sound, for securing in a certain proportion of cases more permanent arrest of tuberculosis than, without undue expenditure, was possible at the Sanatorium. The plan appears to have been successful, and deserving of wider adoption. A résumé of the operation of this "farm colony" will be found in the *British Medical Journal*, February 2, 1918—*Weekly Bull., of the Dept. of Health, N. Y. City, March 23, 1918, vii, No. 12, 93.*

Exercise and Work.—Absolute rest and idleness in tuberculosis tend toward the development of hypochondriasis and neurasthenia. It is necessary to prepare the patient for the resumption of work later on, as sudden transition from the usual sanatorium idleness to active life would result in many relapses. Intelligently applied exercise-work schemes are not objectionable from a medical standpoint, as shown by reports from different institutions. Febrile cases should be kept quiet, the degree of rest depending on the severity of the symptoms. Patients with accentuated symptoms of any kind should not be subjected to any exertion which increases these tendencies. There is no contraindication in other cases for exercise or work, if kept within the patient's ability. Primarily the careful oversight of a trained physician is necessary. The general physical activity should be uniform and steady for the assigned period, and should not lead to sudden strain. Various kinds of work are available, only those need be excluded which are unhygienic. Outdoor occupations are preferable. In public sanatoria the work done should be useful and economical from the institutional standpoint. So far as possible such work should be chosen in which the patients can engage after leaving the sanatorium. The methods followed in applying these principles are: At first there should be a rest stage during which the patient should be studied and brought to a normal condition. This varies in length, depending on the stage of the disease, previous treatment, etc., but need seldom exceed one month. The patient is then put on walking exercises of gradually increasing length and duration on a known course. As soon as his capabilities are established and he can take about two hours' walk a day without unfavorable symptoms, work can be substituted. When many kinds of work are used, accurate estimation of the relative value of each requires careful study. Each patient should be prepared for the amount of work he will probably have to do after treatment ends.—*Exercise and Work, E. S. McSweeny, Monthly Bull., Chicago Munic. Tuberc. Sanit., March, 1918, i, No. 3, 1.*

Should Certain Tuberculous Patients Work?—Tuberculous patients, as far as their ability to work is concerned, may be divided into three groups. (1) Acute and subacute progressive cases.—Those who have active disease, irrespective of the extent of the lesion and those who have cough, fever, loss of weight, etc., should not work. (2) Incipient cases. These patients show physical signs in the lungs, usually a positive sputum, but few or no constitutional symptoms. Most of these can and should work more or less. (3) Advanced cases, e.g., patients who show signs of extensive disease. The majority have constitutional symptoms, and, therefore, should not work. Idleness in many tuberculous patients may be productive of harm, by having a deleterious influence on the muscular system, by producing neurasthenic and psychasthenic conditions, and by diminishing appetite. In prescribing work for the tuberculous, individualization is imperative. In selecting the proper patients for work, we should not be exclusively guided by the stage of the disease, nor by the extent of the lesion. Some incipient cases are not fit for work, even though they show hardly any physical signs, while many patients with extensive lesions in the lungs are fit for some work. The general appearance gives important hints in many instances. Those much emaciated, very anemic, or cyanotic cannot work. The most reliable criteria are obtained by a study of the functional response of the body to exertion, shown by the effects on the temperature, pulse, and respiration. A small rise in temperature is not a danger signal in the average case. It may be due to other causes than to the tuberculous toxemia or mixed infection, most often to nervous instability. Of greater significance is the pulse rate. Patients with a normal pulse rate may work more or less, while tachycardia is a distinct contraindication; so is dyspnea. Many patients continue to work against advice. On the other hand, there are many in whom the disease is quiescent, yet they do not work. To the latter belong many sanatoria patients, and many tuberculous, neuras-

thenic and psychasthenic. Complicating extra-pulmonary tuberculous lesions, e. g., of the larynx, intestines, makes work prohibitory. The work should be simple, preferably at his own occupation if that in itself is not harmful. In institutions the patients can be made to do almost all the work, necessitating no outside help. The vast majority of carefully selected tuberculous patients do well though working more or less. With coöperating patients their subjective sense of fatigue is a reliable danger signal. If the pulse and temperature show any elevations, the patient should rest for a certain time—*Should Certain Tuberculous Patients Work, M. Fishberg, Med. Rec., November 24, 1917, xcii, No. 21, 881.*

Fasting as a Therapeutic Measure.—Spivak breaks with the traditional idea of superalimentation of the tuberculous and has carried out common sense rules in the feeding of his patients with great success. He sums up his experiences as follows: The diet for the tuberculous must be based upon the same calculations as that of the healthy man at rest. A patient who vomits a certain meal should omit that meal during a few consecutive days. A patient who has no appetite should omit one, two, or more meals until the appetite naturally returns. A patient who suffers from pains following the ingestion of food should abstain from eating a number of meals.—*Fasting as a Therapeutic Measure in the Treatment of Gastro-intestinal Disorders in the Tuberculous, C.D. Spivak, Col. Med., April, 1918.*

Advisability of Climatic Change--Many physicians are obsessed with the idea that a change of climate is the only cure for tuberculosis. This idea has become so thoroughly fixed in the minds of some that they will advise a change of climate even though the patient is almost drawing his last breath. One sometimes is almost forced to the conclusion that this is done to get rid of the patient. With our latest knowledge along these lines and our new methods of treatment it is absolutely unnecessary to advise a change of climate, providing home conditions are as they should be. Tuberculous patients can be treated far more successfully and satisfactorily at home than at any other place. Do not send an advanced case to a high altitude. Do not send an active case —one with running temperature. Do not send one who has not means to secure the proper accommodations and cannot remain indefinitely. The mental status of the patient is one of the most important factors in the treatment of any disease and it is especially so in tuberculosis. Their surrounding should be as nearly ideal as possible and certainly as a rule the home offers the best opportunity to secure them.—*Under What Circumstances Should a Patient with Pulmonary Tuberculosis Be Advised to Change Climate, J. W. Bolton, J. of the Miss. State M. Ass., March, 1918, xv, No. 3, 87.*

On Climate.—A person with an ulcerative case of tuberculosis who has given his home climate a chance and at the same time has coupled the climate with other standard methods of treatment, such as fresh air at all times, rest, diet and contentment of mind, and who is at a standstill, will, if he is financially able, unquestionably obtain good results in the Southwest. It is necessary, however, for such patient to have all other factors necessary to the cure, such as rest, diet, etc. If one is fortunate enough to be able to take the cure in one of the sanatoria of his vicinity under the proper regulations, it is better than to go to the Southwest and to be compelled to care for one's self or to "rough it."—*Climate in Tuberculosis, H. F. Gammons, Boston M. and S. J., March 14, 1918, clxxviii, No. 11, 364.*

Against Sending Patients Away.—Crutcher is strongly against the practice of advising patients with tuberculosis to go to the far-Southwest unless they have independent means of support. There are little, if any, facilities for earning a livelihood in New Mexico. To send patients with advanced tuberculosis to such places when they have limited means, is little short of criminal. —*Some Costly Illusions in the Management of Tuberculosis Patients, H. Crutcher, Med. Rec., February 16, 1918, xciii, No. 7, 282.*

Value and Limitations of Sanatorium Treatment.—The value of the sanatorium for suitable cases is established, and cannot be replaced by other measures. It is useless to impeach sanatoria for insufficient or unsatisfactory results when after care is of equal, if not greater, importance. The campaign against tuberculosis has many fronts. Sanatoria alone are not going to banish consumption. A few month in a sanatorium, without adequate after care, are not going to put a consumptive working man back in his factory to do a full day's work. As a rule none but quite early cases of tuberculosis can be lastingly cured in a sanatorium. The provision for after care is an urgent, complicated and difficult problem. Large, comprehensive measures need to be devised through which the arrest secured by sanatorium treatment can be consolidated, and before he returns to it, the conditions of the patient's, bad environment

must be removed by improved dwellings, factories, and workshops. The public can be prepared for this by a more thorough education. With town planning and house construction we may have solid, dry, well warmed and well ventilated dwellings and workrooms, with domestic training we may obtain properly cooked and selected foods.—*The Value and Limitations of Sanatorium Treatment for Tuberculosis, St. Clair Thomson, Practit., February, 1918, c, No. 2, 101.*

The Home vs. The Sanatorium.—Sanatorium treatment is not the only effective method of treating pulmonary tuberculosis, and in the majority of cases is not the best available method. No patient should be advised in general terms to "go west and rough it." Patients who take such advice and get well do so in spite of the doctor. If change of climate is advised at all it should be to a sanatorium. In making choice of a sanatorium it is best to select one near home, or in a similar climate and altitude to the one in which the patient must pass the rest of his life. The majority of all tuberculous patients are best treated at home. Practically all incipient cases are best treated at home, and many of them may continue their usual occupations. The majority of moderately advanced cases might well be educated in so-called sanatorium methods for a time, but the only ones that really need it are the very poor and certain unstable ones of the rich. The only cases that really need sanatorium treatment continuously are the far advanced cases, and these are not accepted. Altitude does not influence the cure, and a high altitude may be an actual detriment to all but incipient cases. There is no climate that will cure tuberculosis. Just as good statistics are compiled in one climate as another. The effect of change of climate is entirely due to the psychological factor. That climate is best which the patient thinks will be best.—*Home Treatment Versus Sanatorium Treatment for Tuberculosis, With Some Observations On Climate, W. O. Wilkes, Tex. State J. of M., November, 1917.*

After the Sanatorium—What?—It is important to bear in mind, in discussiong the problem of the after-care of dismissed sanatorium patients, that we have to deal with sub-standard lives, whose industrial efficiency is below par. The real problem is to get the patient, after his discharge, into work where he may earn a living wage without suffering a relapse. Patients returning from the sanatorium may be divided into three classes: 1. Those who have the erroneous idea that they may live and work as if they had never had active tuberculosis. 2. Those who feel that they cannot work. This is the most common type. 3. Those who live according to the lessons learned while in the sanatorium. In the after care of the ex-sanatorium patient, three elements must be considered: 1. Housing and living conditions. 2. Suitable employment. 3. Medical supervision. Four solutions have been advanced for the problem of employment: 1. The agricultural colony. 2. The industrial colony. 3. The industrial regime, as it now is. 4. An industrial regimen, artificially created and accommodated to the needs of the ex-sanatorium cases. All these are too complicated and impractical. If proper home conditions are available and treatment begun early, it would make no difference what sort of work discharged patients did under average conditions. Medical supervision is essential, examinations should be made every two months, and proper recommendations made to the patient as to the mode best suited for his physical condition.—*After the Sanatorium—What? W. U. Johnson, Monthly Bull. Chicago Munic. Tuberc. San., March, 1918, i, No. 3, 9.*

The Home, Dispensary, Sanatorium and Hospital.—To treat a case successfully at home requires a careful and painstaking arrangement of all the details by the physician. He must prescribe the diet, make out the menu, assure himself that the proper amount of food is taken; arrange the room for sleeping or, better, a sleeping porch. He must supervise the rest in bed or the amount of exercise according to the condition of the case. He must hold a weekly conference with the patient and go over the record of the previous week. He should instruct the patient as to disposal of the sputum, instruct him on safe coughing and advise the other members of the family on prophylaxis. He must also examine the other members as "contacts." With an enthusiastic, painstaking physician who enjoys the confidence of the patient and with the coöperation of the patient and his family any case can be treated successfully at home.

The rôle of the dispensary is chiefly to make the diagnosis and refer the patient for treatment to the sanatorium, hospital or home. Where it is compelled to undertake treatment it must proceed upon the same plan as outlined for the private physician. The patient should be visited at his home by a physician or nurse, while ambulant cases can report once a week to the dispensary where a class meeting may be held, the records of the week past be scrutinized and further advice given.

The advantages of the sanatorium are: its supposedly favorable location as to climate, the constant presence of a skilled physician who can attend to any emergency, the facility of arranging a scientific diet, the facilities for specific treatment such as tuberculin, artificial pneumothorax, etc. Discipline can be enforced more easily, the patient receives more encouragement from receiving the treatment together with other patients. The sanatorium also has its disadvantages. Some patients do not do well on account of its institutional character, its lack of individuality, dislike of routine and diet.

The consumptive hospital is a different type of institution. Its purpose is to take care of advanced cases. The main treatment here consists in making the patient as comfortable as possible and mitigate his sufferings and weariness.—*The Place of the Home, the Dispensary, the Sanatorium or Hospital in the Treatment of Tuberculosis, E. O. Otis, Boston M. and S. J., March 28, 1918, clxxviii, No. 13, 417.*

Sanatorium Food Monotony.—The importance of nourishing food in sufficient quantities is no greater than the importance of having it pleasing and acceptable to the patient. This is recognized by the relatives, friends and well-wishers of the patient. But unfortunately in many sanatoriums attention is given only to the nutritive aspect of the food and its quantity, while a sad indifference is manifested to its no less important psychological aspects. In the patient's humble home, every effort is made—and properly—to cater to his appetite. The well sacrifice their own comfort in order to further the assimilative forces of the sick by attending to the psychic signaling of the stomach. In the sanatorium it is argued that individual attention in these matters cannot be given. Ergo, a nauseating monotony is introduced in the form of a weekly menu as unalterable as the laws of the Medes and Persians. The guaranteed stability of this dietetic order enables every patient to anticipate with apprehension and loss of appetite the exact arrival of the dish that to him happens to be intolerable. Moreover, the anticipatory distaste irradiates over other food in the same meal which would otherwise be agreeable. Thus the patient is deprived of a most important adjunct to his cure.—*Samuel Wolman, M.D., The Survey. Copied from J. Am. M. Ass., December 22, 1917, lxix, No. 25, 2102.*

Monotony of Sanatorium Diets.—In the sanatorium of the Department of Health of the City of New York, food is ranked second only to medicine in the treatment of the case. Plain, wholesome food, approximating as nearly as possible home cooking in its preparation, is served. The menu is arranged to cover a period of four weeks, thus avoiding the weekly repetition of the same meals on regular days. The patient cannot prognosticate the roast beef day, the corned beef day, the lamb stew day, etc., as is the case in so many boarding houses. No restrictions are placed on the patients as to the number of helpings they shall have, and scientific investigation of the value of the food is confined to the laboratories. When patients participate in scientific tinkering with the bill of fare, and are constantly reminded of the necessity of eating just the right amount of food for their weight and disease, they find it, although mentally predigested, robbed of its satisfying character because they have thought about it so much.

The monotony of sanatorium diets is a question easily solved, the sanatorium frame of mind is just as easily established, and plain wholesome food partaken of by cheerful hungry people without a thought of what it costs or of what it does except to satisfy, served intelligently, will never become monotonous. Feed food for its food value, but feed food, not calories. *Letter to the Editor of the J. Am. M. Ass., R. J. Wilson, Director, Bureau of Hospitals, Department of Health, N. Y. City, J. Am. M. Ass., January 26, 1918, lxx, No. 4, 258, 21.*

Tuberculin Therapy.—Immunization against tuberculin does not protect against infection with living tubercle bacilli. It has been shown that it is the focal reaction that is beneficial in tuberculin therapy. During the last eight years the author has treated over 100 cases with tuberculin. Using the B.E. and starting with one one-millionth of a milligram and cautiously increasing the dose according to the individual symptoms, good results have been obtained in some cases. A few cases with slight lung involvement and poor resistance showed good improvement; a few others with complicating adenitis improved slightly. One remarkable case was that of a young man who was admitted to the Rutland State Sanatorium in a desperate condition, weighing 75 pounds. He had advanced tuberculosis, his appendix had ruptured before operation with tubercle bacilli in the discharge. Under tuberculin treatment he was finally discharged as arrested and the sinus had closed. Tuberculin is a logical treatment providing that the reactivity of the patient has not been overcome by profound poisoning from his own lesion. Of course the artificial tuberculin is very much different from the tuberculin produced by the patient. Conse-

quently an effort to treat tuberculosis with living bacilli would be logical if we can overcome the dangers of such treatments. Judging from different reports tuberculin seems to be more efficacious in glandular, bone or genito-urinary tuberculosis than in the pulmonary variety; this may be due to the fact that mobilized antibodies are less able to penetrate the pulmonary lesions. Conclusions: All other methods should be tried before resorting to tuberculin. Graduated exercise will probably liberate a tuberculin with more suitable antigenic properties. The tuberculin of choice is the one having both endo- and exotoxins. The initial dose should be small and the increase governed by the course of the case.—*Tuberculin Therap., H. F. Gammons, N. Engl. M. Gaz., March, 1918, lii, No. 3.*

Tuberculins and Sera in Therapy.—A comparative study of the effects of various tuberculin preparations, vaccines and sera on children suffering from pulmonary tuberculosis shows that the tuberculins give better results than vaccines and sera. It seems that Tuberculin Rueckstand holds first place, with Old Tuberculin next. Bacillen-Emulsion gave less consistent results, while Bouillon Filtrate hardly justified its use. Bruschettini's serum-vaccine came next in degree of efficiency, and further down the list, Sherman's non-virulent tubercle bacilli vaccine and Sherman's catarrhal combined vaccine given together. Different forms of tuberculin given combined at the same time seemed of little value. When one form of tuberculin fails to benefit children with pulmonary tuberculosis, another form may. In administering tuberculin, the method of choice is to determine first the degree of hypersensitiveness. For this, one ten millionth, one millionth, and one one-hundred-thousandth of a milligram are injected intracutaneously. The initial therapeutic dose given is the smallest dose which produces an intracutaneous reaction. If the therapeutic reaction is favorable, the dose is continued until either no reaction is produced when it is increased; if unfavorable, the dose is diminished or the treatment discontinued. The tuberculin may be changed when no reaction follows an increased dose.

The tuberculins were given by mouth in the early morning on an empty stomach; the vaccines of Sherman were given hypodermically and those of Bruschettini intramuscularly.

The study is based on a series of 51 children from private, hospital and sanatorium practice.—*A Comparative Study of the Therapeutic Effects of Various forms of Tuberculins, Vaccines, and Sera in Pulmonary Tuberculosis in Children, M. Solis-Cohen, Arch. of Ped., January, 1918, xxxv, No. 1, 11.*

End-Results of Friedmann's Vaccine.—Friedmann's vaccine for the cure of tuberculosis, by inoculation of patients with large doses of living acid-fast bacilli has been tested on 120 patients in the State Sanatorium at Wallum Lake, R. I. Barnes presents his experience in four tables: 1. Results in 120 cases treated with Friedmann's vaccine in 1913. 2. Results of sanatorium treatment of 287 patients discharged during the year 1911. 3. Duration of life after taking the vaccine of the 62 patients reported dead in table 1. 4. Mortality according to doses. All the Friedmann patients had the benefit of sanatorium treatment for many months, 35 being arrested or quiescent when the vaccine was given, and 8 being ex-patient employes of the sanatorium who asked for the vaccine more to insure against relapse than because they had active disease. The vaccine was further favored in the foregoing comparison in that its survivors had been away from the sanatorium nearly a year less than the sanatorium survivors of 1911, and consequently the Friedmann patients should have had a lower mortality rate. From all these considerations it appears certain that this vaccine had no beneficial effect on the patients.—*End-Results of Friedmann's Vaccine, H. L. Barnes, J. Am. M. Ass., March 30, 1918, lxx, No. 13, 909.*

Treatment of Tuberculous Dysphagia.—The writer strongly advocates in addition to other local and constitutional treatment the injection of the superior laryngeal nerve with the following solution; novocaine, 2 grains; chloroform, 10 minims; alcohol, 6 drams; water, 2 drams—essentially a 65 per cent solution of alcohol.

A summary of the results of the nineteen cases is as follows: The ages ranged from twenty-two to forty-eight years. All were males with the exception of two. Tubercle bacilli were present in the sputum in all cases except one. All except five were far advanced pulmonary cases; four were moderately advanced; one had tuberculous epididymitis and but slight pulmonary changes. Twelve had involvement of the epiglottis, none of which were of the Turban type, and all presented ulcerations. Thirty-nine injections were made, twenty-one of which were bilateral; nine were made on the right side and nine on the left side, making eighteen unilateral injections; six had absolute cessation of pain within a few minutes after the first injection and one within twenty-four hours. One had partial relief after the first, and absolute

cessation after the second injection. One had no relief after the first, and absolute cessation after the second injection. Nine patients had only very slight discomfort after one or more injections. Only one patient had no relief. This patient was dying at the time of the injection. The relief was marked in all cases. The shortest period of relief from one injection was three days and the longest forty-two days. The shortest total number of days of relief from more than one injection was six days and the longest one hundred and five days. Eight patients had but one injection; four had two injections; four had three injections; three had four injections. Two patients left the hospital before the return of pain. Five died in from six to twenty-four days after injection without return of pain. Relief of pain means relief of any discomfort whatever.

Conclusions: In all cases of painful dysphagia the internal laryngeal nerve should be blocked. There are no contraindications to nerve blocking and this procedure aids the dietetic treatment by removing or lessening dysphagia sufficiently to allow the patient to eat necessary food.

More rest is obtained for the throat due to cessation of pain and any number of injections may be made and the patient kept in constant comfort by injecting as soon as the pain recurs.—*Treatment of Painful Dysphagia in Tuberculous Laryngitis with Special Reference to Nerve Blocking, R. McD. Lukens, N. York M. J., February 23, 1918, cvii, No. 8, 353.*

On Pessimism in Tuberculosis.—The individual tuberculous patient is not infrequently rendered unduly morbid when he is advised to leave home and family and betake himself to a sanatorium. In the first and even in the second stage tuberculosis can be treated at home or better in the "home hospital." The danger in the first stages to the public has been entirely exaggerated and with reasonable preventive measures infection of healthy individuals is hardly likely. The "home hospital" has also proven a good preventorium for children.—*Exaggerated Views about the Contagion and Outcome of Pulmonary Tuberculosis, B. Robinson, Med. Rec., February 9, 1918, xciii, No. 6, 238.*

Embolism During Artificial Pneumothorax.—The greatest danger in the treatment of pneumothorax is without doubt the formation of emboli. Everybody who practices this therapy should be thoroughly familiar with the causes of embolism. At autopsy on cases of embolic death gas is not always demonstrated in the cerebral vessel or in the coronary artery. This proves nothing because the autopsy is hardly ever performed immediately after death and almost never under exclusion of entrance of air. Very little gas is necessary for fatal embolism. All depends on where the gas is being caught. Instead of gas a thrombus located in a pulmonary vein may be embolized. In analyzing the mechanism of embolism the position of the patient during the operation appears to be a contributory factor in the majority of cases. As the point of puncture is made the highest point of the thorax, those tissues are subjected to extra stretching and any blood vessel which may be injured in this region will gape more than usually and suck up gas more easily, especially because the diseased side has to make larger excursions than normal. It is an error of omission if the patient is induced to take deep breaths during insufflation. Embolism can occur:

1. Locally, in the vicinity of the needle or of the stitch canal:
   - a. Gas from the needle,
     - α. From tube (manometer, gas tank),
     - β. From external air while cleansing the needle with the stylet;
   - b. Gas from the alveolar air;
   - c. Gas from pneumothorax.
2. At a point distant from the needle:
   - a. Gas from alveolar air;
   - b. Gas from pneumothorax.

The mechanism of the local varieties of embolism is easily understood. To avoid it, one should pay attention to the following points: At the first operation the needle should not penetrate any deeper than 3 cm. on the average. The stylet should not pass the point of the needle. The needle should be pushed ahead steadily in one direction but very slowly and should not make excursions in any direction. The patient must lie perfectly still and breathe quietly and evenly. Every new puncture should be made exactly at the same spot where the previous ones had been made. Under no circumstances should gas be permitted to enter unless one is absolutely sure, to be in the free pleural space.

During refills embolism occurs most frequently at a point distant from the puncture. This fact has unfortunately been overlooked by clinicians and pathologists. Slight adhesions are frequently torn by increasing pressure and if the tear occurs at a point where a thrombosed vein is situated, the way for an embolism is prepared. The weakest point of an adhesion is usually its pulmonary attachment. If an adhesion is merely stretched to the utmost during a refill, it

may tear later on, while the patient coughs or sneezes or strains at stool. In these cases the signs of embolism occur some time after the operation. To avoid the mobilization of thrombi in the veins of an adhesion, one should give little gas at a time and under low pressure. The author gives rarely more than 300 cc. at the first puncture and 150–400 cc. at the refills, very gradually increasing the pressure.—*Ueber Emboliebildung bei der Behandlung mit kuenstlichem Pneumothorax, van Voornveld, Brauer's Beitraege, 1915 xxxiv, No. 3.*

Artificial Pneumothorax.—No sufferer of pulmonary tuberculosis should be denied the benefit of artificial pneumothorax where other measures have failed. The successful treatment of phthisis by this method demands that there be a steady, continued, positive pressure in the chest as indicated by the manometer. In most instances the lower part of the lung lends itself more readily to compression, both on account of the anatomical arrangement of the chest, and because of the freer movements and the less frequent involvement of the lower lobes. One of the complications of this treatment, pleural shock, can often be avoided by cocainizing the pleura and a preliminary hypodermic injection of morphine. The most common complication is the occurrence of a pleural exudate. This happens in 40 to 50 per cent of cases and some eventually become purulent. The simple effusion can be aspirated and replaced by nitrogen. Gas embolism and accidental pneumothorax are rarer complications. The x-ray is an important help in this treatment as it serves to determine the extent of the pneumothorax produced, the presence of effusions, the position of the collapsed lung, and, sometimes, the presence of adhesions. The unilateral, non-adherent, tuberculous lung is still considered the ideal for this form of treatment. It is, however, also used with justification as a palliative measure in advanced cases, but in these the difficulties and complications mentioned are to be mostly expected. Pneumothorax should be induced in all early cases which have shown no improvement after several months of sanatorium treatment. The collapsed lung should not be allowed to re-expand in too short a time. Compression should be maintained until all activity has ceased, and re-expansion should then be allowed very slowly. Where the treatment has been carried out thoroughly it may be expected that about 50 per cent of the cases will be either arrested or markedly improved.—*Artificial Pneumothorax and Pulmonary Tuberculosis, C. Floyd, Boston M. and S. J., March 14, 1918, clxxviii, No. 11, 349.*

Results of Compression by Pneumothorax on the Lung.—Much has been written about the results of pneumothorax treatment from a clinical standpoint, but little from the anatomical side. The author has had the opportunity of performing autopsies on 5 cases of pneuomothorax where compression has been maintained from 3½ to 18 months, and gives a report of the condition of the lungs. The main effects on the compressed lung are, atrophy of the lung, thickening of the pleura, marked development of cicatricial processes, especially the fibrous bands extending from the pleura, arrest of the evolution of the cavities and production of a limiting membrane with occasional obliteration of cavities, relative absence of fresh tuberculous granulations, and atelectasis of the healthy parenchyma; all these processes being apparently proportional to the duration of the compression.

The author would draw the following practical conclusions from these 5 cases. (1) The existence of active lesions in the opposite lung should be a contra-indication to this form of treatment. (2) The duration of the compression to produce a cure should be very long, 2 years being the minimum. (3) The anatomic condition of the lung before compression has an important bearing on the length of the treatment, infiltrating lesions healing more slowly than cavities. (4) The compressed lung will only rarely re-expand. (5) The distinction between immediate improvement and actual healing must be clearly remembered.

On the whole these autopsies reinforce the favorable clinical impression of the benefits of pneumothorax treatment.—*Effets anatomiques de la compression par le pneumothorax sur le poumon tuberculeux, R. Burnand, Rev. méd. de la Suisse Rom., December, 1917, xxxvii, No. 12, 729.*

Heliotherapy and Pigmentation.—The authors consider that a study of pigmentation in its relationship to heliotherapy is of interest and importance. A brief review of the history of local heliotherapy and later of general exposure to the sun's rays points out the various problems and theories of this method of treatment. The observations on which the authors base their study were made in Leysin, Basle and Vidy-plage during the years from 1912 to 1917. As all previous attempts to classify the degree of pigmentation have been more or less indefinite, a "pigmentometer," showing the various gradations of color possible, was made and used in the work. Studies of the natural

cutaneous pigmentation of children in relation to the color of the hair were made; secondly, the rapidity in production of pigmentation in the presence or absence of tuberculous lesions and also in relation to the percentage of hemoglobin; thirdly, the rapidity of depigmentation and lastly the relationship of rapidity to degree of pigmentation.

Physiologically pigmentation is a special means of defense of the skin against external agents, mechanical, chemical or photochemical. The greater the degree of pigmentation the less are actinic rays allowed to penetrate. Pigmentation is caused by the development of granules of melanine in the deeper cells of the Malpighian layer of the skin. Does this pigmentation play an active rôle in the process of healing by heliotherapy? Although at first sight this might seem a justifiable conclusion the authors deduce from their observations that there is no clinical fact to attribute to the pigmentation in itself any direct activity in the healing. It is however a valuable test of the general resistance of the organism and is important in prognosis. There is a definite relationship between the degree of pigmentation and the percentage of hemoglobin. Many children show in the early stage of the cure a diminution in hemoglobin and an accompanying lassitude and malaise which is transitory.

It would appear that it is the hemoglobin which furnishes the substance necessary for the production of melanine.—*Heliotherapie et pigmentation, L. Jeanneret and F. Messerli, Rev. méd. de la Suisse Rom., November, 1917, xxxvii, No. 11, 668.*

Treatment and Training in Surgical Tuberculosis.—The Lord Mayor Treloar Hospital for cripples has been in existence for nearly ten years. The number of admissions for this period has been 1,890, the cases being of the most severe forms of surgical tuberculosis. The mortality of less than 2 per cent is lower that the mean annual mortality for all children of similar age in England and Wales. These results are attained by stimulating rather than supplanting the efforts of nature to defend itself from disease. The patients are removed from their unhealthy surroundings and placed under most suitable climatic conditions. Fresh air, sunlight, good food, rest to the diseased part, avoidance of secondary infection, correction or prevention of deformity, and skilled nursing do the rest. Conservative treatment is favored. The child's time in the hospital is not wasted. Every patient above the age of five is educated by skilled teachers as far as his or her condition permits. When treatment is completed, an efficient system of after-care is provided, the patient is kept under observation and the parents are being guided, not only from a medical but also from a sociological standpoint. Advice is given as to the most suitable occupation to be followed. As far as possible those boys who still remain handicapped by irremovable deformity are transferred to the college for a further period of three years' training in a trade suited to their limitations. Of the cases admitted since the foundation of the hospital 93.06 per cent have been discharged with the disease arrested; 1.6 per cent have died of tuberculous disease; and 5.34 per cent have been removed before the disease was arrested. While a proportion of those discharged with arrested disease remain with some deformity which cannot be corrected, because of too late admission, yet they are not incapacitated. In the large majority of cases they are able, as result of the training given them, to earn their own living.

The experience gained seems to point to the following: (1) Tuberculous cripples should be treated conservatively, but energetically, for as long a period as possible and soon after the onset of the disease. (2) During the treatment their education should be, where possible, efficiently undertaken with special regard to their limitations and requirements. (3) Even the most advanced cases may be very materially benefited and their deformities either corrected or reduced. (4) After-care and guidance should be systematically given. (5) Apart from philanthropic considerations the thorough treatment of these patients is not only logical but economically sound.—*The Treatment and Training of Cases of Surgical Tuberculosis, H. J. Gauvain, J. of State Med., February, 1918, xxvi, No. 2, 44.*

Local Heat and Metallic Copper in Surgical Tuberculosis.—In conjunction with the tubercle bacillus, tuberculous disease may be considered as the result of a process of local anemia or obliteration of the vessels. Stenosis of the pulmonary artery terminates in phthisis, while mitral stenosis, causing congestion of lung parenchyma, tends to restrict tuberculous disease. In surgical tuberculosis the author attempts, therefore, to excite the circulation locally by the use of heat, thus provoking more active vascularization. For this purpose a flexible thermophile or heat conducting tissue is used, which adapts itself closely to the shape of any area of the body measuring up to thirty by forty centimetres, and is applied over a few layers of gauze. Upon heating with the electric current the temperature rises in a few minutes to 50°, 60°, 70°, or even 80°C. A thermometer passed permits

watching the temperature attained. The heat is applied daily or on alternate days for ten to twenty minutes, according to the persistency of the vascular reaction provoked. Above 50° C. the virulence of the tubercle bacillus begins to be impaired, and phagocytosis, favored by the increase of local circulation, becomes correspondingly more effective. For bony and lymphatic involvements, the optimum temperature is 50° to 70°. Into the depths of sinuses or at the surface of open lesions, powdered metallic copper in small amount is placed every two to four days. The resulting nascent copper chloride exerts a distinct antiseptic effect, and progressive improvement in the local condition is noted. Luton, a few years ago, maintained that copper acetophosphate would cure tuberculosis. In Berthier's hands the treatment proved especially effectual in tuberculous glandular involvements. For small areas, the electrically heated tissue was sometimes replaced by small sacs of sand at 50° to 70° C. with satisfactory results.—*Quelques considérations des essais de traitement de la tuberculose chirurgicale. Chauffage local et cuivic, Berthier, J. de Méd. de Paris, January, 1918, No. 1, 12.*

Radium in Tuberculosis of the Skin.—Aikins treats with radium the various forms of tuberculosis of the skin, the most common of which is lupus vulgaris. The other eruptions are known as tuberculides and exhibit the following characteristics: (1) They appear in a tuberculous subject who reacts to tuberculin; (2) the eruption is usually bilaterally symmetrical; (3) the histology suggests tuberculosis; (4) most of the cases tend to spontaneous recovery; (5) Koch's bacillus is generally absent; (6) inoculation of guinea pigs is seldom successful. The results of treatment have been very satisfactory.—*Radium in Tuberculosis of the Skin, W. H. Aikins, Urol. and Cutan. Rev., January, 1918, xxii, No. 1, 40.*

Tuberculosis and Military Organization.—Pulmonary tuberculosis is still the most prevalent, and, on the whole, the disease which is most destructive to human health and life in civilized countries. So far as the spread of tuberculosis is related to war, the situation is somewhat confused. It has been widely advertised that the influence of war on tuberculosis has been powerful, and evidence in support of this assertion has been adduced from France. The statement has been frequently made that since the war tuberculosis has increased enormously there, and that this increase is due entirely to the non-enforcement of well-timed measures by the responsible authorities. On the other hand, Dr. Arnold C. Klebs (*Naval Medical Bulletin* Vol. II, No. 4) agrees with many of those who have the best means of knowing in the opinion that this view is not correct, or, at any rate, is greatly exaggerated, and he thinks that the "war tuberculosis program" formulated by the Army and Navy authorities in this country is not altogether wise, and he lays emphasis on the fact that an attempt to base the prevention of tuberculosis on methods of prophylaxis against acute diseases would be a short-sighted blunder.

Klebs points out that the assumption that the healthy life led by the enlisted men of the army and navy tends to good health, while it contains the elements of truth, is somewhat exaggerated. When, however the service is prolonged, and especially in actual warfare, the strain becomes great, sanitation and hygiene are neglected, particularly in trench warfare and when billeting in private houses has to be resorted to.

Training at home should anticipate these conditions, and therefore "health-resort standards," or the elaborate hygienic and sanitary arrangements of many of our public institutions, ought to be barred from military establishments. To teach men to harden themselves, to avail themselves almost instinctively of healthful opportunities wherever they are present—washing, bathing, etc.—is essential. In our aim at simplification it ought to help when we realize that practically all our prophylactic measures come under the heading "cleanliness." Thus cleanly habits and clean open air are now our mainstays against tuberculosis. The relative importance which the specific and non-specific factors have in the production of tuberculosis must determine our preventive measures, as it should guide also our therapeutic methods.

A new profession, that of the medically trained educator, the "social physician," will have to cope with the problem of the general management of the tuberculosis, for which the general physician, with his specialistic preoccupations, is little fitted. The new army and navy might well offer an immense and most fertile field for the raising of such a profession, which, at present, is recruited almost entirely from amateurs—well-to-do, philanthropically-inclined physicians, who will give some of their precious time to committee meetings but to very little independent thought or work. The tuberculosis problem is an important phase of military organization, and the suggestions made by Klebs are valuable.—*Editorial, Med. Rec., March 9, 1918, xciii, No. 10, 425.*

Military Antituberculosis Program Perfected.—Plans for a complete program for the prevention of tuberculosis in the army have been perfected by the National Association for the Study and Prevention of Tuberculosis working in coöperation with the Surgeon-General, the Y. M. C. A., and other agencies. This, it is predicted, will put the impending second draft on a better health basis than the first. The program will include not only a follow-up for every man discharged on account of tuberculosis, but a thorough-going health educational campaign among the soldiers.

Prior to the first draft the National Association began to outline a preventive campaign. Owing to the magnitude of the task and the many practical delays in perfecting and applying the details of this scheme, the results were not as encouraging as might be expected. This was due to the fact that the report of names of men rejected by the draft on account of tuberculosis was inadequate, the slowness of the machinery in getting under way, and the many difficulties in determining the status of the man.

Inasmuch as these enlisted or drafted men do not become accepted soldiers until after their probationary period lasting from three to six months in the various services, the government assumes no responsibility for the after-care of those whose health breaks down during that period. Hence, this problem belongs to the civilian boards of health and the unofficial health organizations.

The National Association program falls into two main divisions: (a) follow-up work and (b) educational work. The first obstacle to the follow-up program was Section Eleven of the Selective Service Regulations regarding the second draft which forbids giving a record of a man's condition to anyone except certain designated officials. The National Association officers, however, placed before the War Department the importance of this work and were influential in persuading them to open the records of rejected men to state and local boards of health throughout the country, through the United States Public Health Service and the Council of National Defense.

Inasmuch as the above section of the regulations does not apply to men dismissed from training camps after they have passed draft boards, the association arranged with the Surgeon General and the division surgeons in camps to receive the names of all men thus dismissed. These lists are divided up by states and forwarded to state associations and state boards of health for follow-up work. Where men are referred to localities where there are not at present facilities for this follow-up work, the association will use its good offices to promote the establishing of such facilities.

In the meantime, the Medical Department of the Army has perfected its machinery for weeding out these tuberculosis cases. Every man passed by the draft board after going into camp is examined by the regimental surgeon, re-examined by a tuberculosis board, and then if suspected of tuberculosis, again examined by a tuberculosis expert. This follows a general policy mapped out and recommended by the association.

A large number of men have already been accepted into the service who were known to be tuberculous, many of them formerly inmates of tuberculosis sanatoria. Part of the association's work has been to get in touch with every tuberculosis sanatorium and dispensary in the country and compile lists of all recent male inmates of draft age, giving the history of their cases and whether or not it was known if they were in the army at present. Hundreds of such names have already been received. This data is forwarded to the training camps, the men are located and the results are reported back to the sources of information.

Furthermore, the association has sent a letter to all of its fifteen hundred local coöperating agencies giving the provisions of the the second draft and urging that these agencies procure the names and addresses of all the men of military age in their section who are known to have tuberculosis; get in touch with these men and arm them with the necessary affidavits to prevent, if possible, their being passed by the draft board, and recommend to the local draft boards the names of approved tuberculosis experts in their section.

The association is also coöoperating with the Surgeon-General's office to aid the government in providing sanatoria for those men who have been discharged from the service on account of tuberculosis after their probationary period has expired. All full-fledged soldiers and sailors returned from France or other stations will be cared for as near to their own homes as possible in sanatoria accommodations provided by the government. The government intends to utilize so far as possible existing institutions.

From the United States Marine Corps the association has secured each month a report of men rejected for tuberculosis from all its recruiting stations, and these men will receive the regular follow-up attention.

From the second or educational division of the program it is hoped to derive the greater ultimate good by the establishment of fundamental preventive measures among the well.

The association is interested in any kind of an educational campaign among the men

in the various military camps that will tend to promote interest and information with regard to the control and prevention of communicable diseases, and toward the promotion of public and individual health in general. In the mobilization of such large numbers of men in various camps throughout the United States there have developed an unusual number of somewhat serious epidemics of colds, coughs, pneumonia, measles and various other respiratory and communicable diseases. That all of these diseases can be controlled by education and by the exercise of adequate public health measures has been clearly demonstrated in the civilian population throughout the United States. Most of these epidemics are spread through ignorance and carelessness. It is inevitable where large numbers of men from all walks of life and with all possible diseases and variations of physical habits are thrown together in somewhat uncomfortable and crowded living conditions, that there will be an immediate increase in the amount of sickness from communicable diseases. It must be obvious, however, to even the most superficial observer, that if these men can be taught to maintain a reasonable standard of personal hygiene and can be given a knowledge of the methods and principles of the control of communicable diseases a rapid diminution in the sickness rate will follow.

In coöperation with the Educational Committee of the National War Work Council of the Y. M. C. A., the association will furnish a number of stock lectures dealing with tuberculosis together with lantern slides to illustrate them. It will also arrange to put the educational secretaries of each of the camps in touch with public lectures in and around their respective camps. The association has requested the War Department to give careful consideration to the desirability of appointing one or more special officers detailed to lecture on tuberculosis and allied health subjects in all of the army camps throughout the country.

The association has prepared a special circular entitled, "Red Blood," giving in brief and attractive form a message to the soldier relative to personal fitness, a health "Don't Card;" and a Public Health Manual may also be distributed, the latter being a textbook of personal hygiene.

The association will also arrange to distribute through the departmental executives of the Y. M. C. A., a number of special tuberculosis exhibits known popularly as "The Parcel Post Exhibit." In connection with these moving picture films and lantern slides will be used.

The field secretary of the association, Dr. Pattison, is visiting the training camps and supervising this educational work.—*Editorial, P. P. Jacobs, J. Lab. and Clin. Med., February, 1918, iii, No. 15, 314.*

Phantom Tuberculosis.—America was startled when it was reported that 86,000 soldiers had been discharged from the French Army during the first year of war on the ground that they were afflicted with tuberculosis. Calculations made upon this basis showed that France had a larger portion of tuberculous inhabitants than any other country in the world. A distinguished American physician came back with most alarming reports as to the prevalence of tuberculosis. The families of soldiers who have been ordered to France or expect to be ordered to France were terrified at the prospect of having their men submit to the danger of similar infection on such a vast scale in addition to suffering all the hardships and risks incident to trench warfare.

Our anxiety, however, seems to have been uncalled for. Major Edouard Rist, of the Medical Corps of the French Army, whose civilian life was devoted entirely to the study and treatment of tuberculosis, delivered a most reassuring message to the medical profession of the United States in the course of an address before the twenty-fifth annual meeting of the Association of Military Surgeons of the United States, which appears in the December issue of *The Military Surgeon.* During the whole of 1915 and half of 1916 Major Rist was in charge of a large hospital in the war zone and was consultant to a group of other hospitals in that zone. He was then sent to the United States to serve in the Office of the Surgeon General of the United States Army as a liaison officer in conjunction with Colonel C. U. Dercle.

When on duty at the front he found that many of the men who had been sent to the hospitals as suffering from tuberculosis showed no evidence of this disease on careful examination. On his suggestion all men sent back from the front with a diagnosis of tuberculosis, with a history of coughing, hemoptysis, or pleurisy, were sent to a clearing station, of which he was put in charge. He made x-rays of each of these cases himself, had the sputum, the throat, and the nose of each patient examined by a specialist, and kept each patient under observation for a week. As a result of this he was able to send back to the front many soldiers who would otherwise have been relieved of active duty and finally discharged on account of a mistaken diagnosis. He found that between 80 and 90 per cent of these "tuberculous" soldiers were not tuberculous at all and he estimated that less than 20 per cent of the 86,000 troops dis-

charged during the first year of the war as tuberculous actually had tuberculosis.

In the majority of the cases where this mistaken diagnosis was made the patient had a cough. Some had a common cold, an acute rhinitis with a slight rise in temperature, or a loss of appetite, but there were no bacilli in the sputum, no definite dulness, and no tubular breathing, although some had bronchial râles. In these cases the fluoroscope showed perfectly transparent lungs. In nearly all there was some chronic infection of the upper air passages and more especially of the nasal cavities. Among these troubles were found chronic maxillary sinusitis, chronic purulent discharge from the ethmoidal cavities, hypertrophied turbinated bones, atrophic rhinitis, adenoids, deflected nasal septum, etc. These conditions have in many cases been so persistent as to be overlooked entirely by the patient, yet all have one symptom in common, coughing. It is to these conditions that Major Rist applies the very apt term of "phantom tuberculosis," which disappears when the nasal trouble is properly cared for.

Colonel George E. Bushnell, assistant to the Surgeon General and chief of the Divivion of Internal Medicine in the Surgeon General's Office, in a paper published in *The Military Surgeon* during the year, pointed out the frequent errors made in the diagnosis of tuberculosis and quoted statements made by Meissen, Roepke, and Muller showing the tendency on the part of German physicians to give a diagnosis of tuberculosis on uncertain and slight indications. It is most reassuring to find observers so competent as Colonel Bushnell and Major Rist protesting against the unnecessary alarm regarding the prevalence of tuberculosis in France.—*Editorial, N. Y. M. J., January 5, 1918.*

The Significance of Tuberculous Signs in Military Life.—The orthodox views held during ordinary times on the significance of physical signs in the chest have undergone much change in the minds of some observers, in view of the extraordinary behavior of tubercular individuals while in the military service. The auscultatory signs that previously singled out an individual as tubercular and enforced upon him the most rigid regimen are no longer given the same weight as regards the availability of such individuals for military life. It would seem that the whole fabric of the art of physical diagnosis developed to such degree in order to discover incipient pulmonary tuberculosis long before the stage of tangible symptoms, and at a period when the chances for cure are hopeful, is given little credence by some of the European military medical men. Fishberg. (*Jour. Amer. Med. Assn.*, June 16, 1917) joined these foreign observers in nullifying the significance of physical signs unless associated with symptoms, as indices of pulmonary tuberculosis. If this view becomes the abiding one in civil as well as military diagnosis the whole art of physical diagnosis as applied to the lungs must undergo radical revision. It is true that many of the physical signs associated almost entirely with tuberculosis are really of non-specific origin. Yet it is very much of a question whether any pulmonary lesion that gives these physical signs no matter what the exciting agent or organism had better not cause the individual to be put under the same strict regimen as those who have undoubted symptoms of tuberculosis. The experience of the European medical officers has been that unless an individual has symptoms—temperature and unstable pulse on slight exertion—as well as signs, he can do as well under a military regimen as those without signs suspicious of pulmonary involvement. Indeed, they maintain that camp life may cure many of these incipients or suspects. Certainly the rigors of military life are not more severe than many of the conditions obtaining in industrial life. There are histories of many English, French, German and Italian cases that were sanatorium patients before the war, and yet who weathered the strict military life without detriment to their health. Osler thinks that the development of tuberculosis during the war has been less than during peace times. This is particularly noteworthy because only the most cursory care could be exercised in excluding the unfit, and one would expect, therefore, much more breaking down than at other times. On the other hand, Osler's figures for this disease in the military service are somewhat to be modified by the fact that the very magnitude of illness and casualty, with the shortage of medical officers, would tend to make much of the morbidity from actual tuberculosis overlooked as such. But, on the contrary, it is quite likely that, at least in so far as initial infection among troops goes, there is very little of it because tuberculosis is really an infection of childhood, the adult infections being really re-activations of dormant tuberculosis contracted in early life. Adult non-infected soldiers are not likely to be infected by a tubercular soldier who managed to slip by the examiner. When the large number of cases of tuberculosis among French troops, placed at over one hundred thousand, and credited to carelessness in examination at a time of emergency, is analyzed, it will be seen that the percentage is actually lower than that during ordinary times.

The belief that adults are not likely to be infected, even from very active cases, unless

they have a dormant lesion within themselves dating from childhood, makes necessary a revision of the whole idea of the campaign against tuberculosis—and perhaps these observations on tuberculosis may be one of the many good things arising from an evil. If the force of this campaign can be directed entirely against the infection in childhood, the work will be very much limited and simplified. The whole idea is plausible when it is remembered that the morbidity from some forms of tuberculosis in children is as high as 65 per cent. The limitation of infection in childhood would almost solve the question of tuberculosis in adults, and so generally. The older the individual, the less desirable are his tissues as media for the development of the tubercle bacilli.

On the other hand, these views regarding military tuberculosis are rather radical, if not somewhat premature. It is too early for any observations to revise our whole conception of the physical signs of tuberculosis, and of the significance of this disease with respect to certain activities. Judgment on this whole subject is better reserved until a later period, with many other judgments growing out of present conditions. There is no doubt that in a military emergency much good material is excluded by rejecting all who have signs suspicious of tuberculosis, or because they have been patients in sanatoria. This applies to the exclusion of individuals for other physical defects. Instead of admitting or excluding all who are not absolute on first blush, it would be more in keeping with the selective attitude of our military mobilization to find military employment suitable for every one presented. There is no one for whom a niche of usefulness cannot be found. Those who are otherwise rejected could be made useful to themselves as well as to the service, and, besides, they would be where they could be under observation to determine adverse effects should they arise.—*Editorial, Boston M. and S. J., December 13, 1917, clxxvii, No. 24, 846.*

Tuberculosis and War.—Pleurisy with effusion is the most common manifestation of tuberculosis developing on active service. These cases do not demand discharge from service but do require temporary discharge from military duties and plenty of time to recuperate. Sending the victim back to active service after insufficient recuperation is likely to cause serious remission. On the other hand, active pulmonary tuberculosis even in the beginning, calls for rejection or permanent discharge to a sanatorium and dismissal from service. A man should not be rejected merely because he was an inmate in a tuberculosis sanatorium at some previous period, for patients in the incipient stage who have remained well for one or two years may be accepted, but they must be watched in training camps. If they pass through training they may be put on active duty at the front. Soldiers who develop tuberculosis should be dismissed from service but not from the Army, for the sudden release from rigid milita discipline gives rise to serious difficulties when treatment is attempted in civil institutions. Treatment under military control has proved the most satisfactory While it is a greater initial expense to the Nation, the final results justify the outlay. Although we are better prepared to cope with this problem than France ever was, we must enlarge our institutions and build new ones. We must establish industrial colonies and open-air schools, and provide for visiting nurses and dispensaries for the after care, or we shall find ourselves facing a serious situation.—*What We May Learn From the French War-Tuberculosis Problem, R C. Matson, Northwest Med., December 1917, xvi, No. 12, 355.*

Tuberculosis and War Conditions.—Newsholme notes the increased mortality not only from tuberculosis in all its forms, but also from influenza and bronchitis during the past three years. After reviewing the methods of administrative control of tuberculosis in England at the outset of the war, he discusses the dfficulties and defects of this system as shown up by war conditions. These difficulties and defects may be considered under the following headings: (1) With relation to the patient: Owing to the increased demand for labor and higher wages, poor patients with tuberculosis are not seeking medical advice as was formerly the case. (2) With relation to the private practitioner: It is evident that, with so many of those in military service, those remaining are overworked and cannot do as much good or give so much individual attention as was the case prior to the outbreak of the war. (3) The tuberculosis officer: Many full time persons of this nature have been replaced by men working only part time with, naturally, poor results. (4) Sanatoria: The results from the sanatoria are not so good as formerly, owing to the fact that not only are incipient cases less frequent but also advanced consumptives who formerly would not have been admitted to a sanatorium are now sent there because there is no other place for them to go. Sanatorium and hospital treatment are the most important parts of any war program for tuberculosis. Unless many beds in each of these institutions are available such a program is bound to fail.—*The Relatian of Tuberculosis to War Conditions, Newsholme, Lancet, October 20, 1917, No. 4912, 591.*

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